DOCUMENT RESUME

ED 391 093 CE 070 708

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ABSTRACT

This document contains the learning modules developed during the Nabisco Richmond Facility's workplace literacy project. The first section is the facilitator's guide and the second is the participants' copy. Modules are included on the following topics: listening, problem solving, applied math (including calculator usage and military time), graph comprehension, and reading comprehension. Each unit includes activities for minimum, moderate, and maximum skill levels of employees, as well as activities for total group and individualized instruction. Activities include worksheets and tests, with test answers and teaching ideas included in the instructor's copy only.

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ED 391 093

REACH

Richmond Enhanced Academics for Change

Nabisco Richmond Model

Skills Effectiveness Training for Workplace Literacy: The Non-Intrusive Determination of Workplace Literacy Skills Requirements in a Union Environment

Facilitator Copy

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CE070708

The material presented in this curriculum is the result of a detailed task analysis of jobs in one Nabisco Facility. The job tasks have been correlated to the academic skills necessary to perform each job task accurately, safely, and efficiently. Whenever possible, actual job situations and materials have been utilized. However, to protect proprietary information, similar scenarios have been created.

Foreword

To the facilitator:

This is the first of a series of modules custom designed to enhance the basic workplace literacy skills of listening, reading, graph comprehension, applied math, problem identification and problem solving.

This first module covers communication skills in general with emphasis on practicing and developing listening and speaking skills in a workplace environment.

This module is intended to

1. serve as an orientation to the program and to encourage a high comfort and high motivation level with the participant.
2. lay the foundation for the subsequent modules.
3. establish the credibility of the program.

The learning activities in this and all subsequent modules have been designed to meet three levels of assessed need for this workplace. Just as the three skill levels require different complexities of thought, so too do the learning activities require different complexities of thought.

The learning activities are color coded to indicate the skill level for which they are designed.

Minimum level activities - yellow
Moderate level activities - blue
Maximum level activities - pink

Also, the learning activities will indicate whether the material is designed for individualized instruction or group instruction. In general the goal is:

Listening - total group activities
Reading - individualized activities
Graph Comprehension - individualized activities
Applied Math - individualized activities
Problem Identification - individualized and occupational group activities
Problem Solving - individualized and occupational group activities

Content Outline

Minimum Level Listening

1. Communicating with Co-Workers
    a. Recording Spoken Information
    b. Receiving Calls
    c. Asking Questions
    d. Notifying Others of Needs/Problems

2. Communicating with Supervisors

3. Communicating within a Work Group

Moderate Level Listening

4. Receiving Directions and Details
    a. Safety Meetings
    b. Following Oral/Auditory Directions
        (1.) Supervisory Instructions
        *(2.) Computer/Mechanical Alarms

Maximum Level Listening

5. Problem Identification/Troubleshooting
    a. Listening to people/Understanding complaints
    *b. Listening to things/detecting abnormal noises in machinery or equipment

6. Problem Solving

*on the job training

Table of Contents
Listening Skills

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Outline

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Activity 18	Group Decision Making
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YELLOW -
MINIMUM LEVEL

Activity: 1 - Find Your Twin

Objective(s): This activity will enable participants

1. To demonstrate ability to listen as distinguished from hearing.
2. To follow simple, oral directions.
3. To practice listening (especially interpretation and evaluation), speaking and analytical skills.
4. To practice observing detail in a simple schematic.
5. To practice translating observations into accurate descriptions.

Materials Required:
Ten sets of identical cards of a simple schematic (20 participants)

You need to know:

About Listening -

1. All jobs require good listening and speaking skills.
2. Hearing is sensing or receiving sound and recognizing it. It's physical!
3. Listening is hearing sound but also...
    - Interpreting the meaning of the sound and
    - Evaluating the sound and deciding how to use it and
    - Reacting to the sound based on what you heard and how you evaluated the sound.
4. The average listener remembers only about 50% - one-half of what he has heard 20 minutes after he has heard it!
5. If 100 million people make a listening mistake on their jobs each week and it costs $10 to correct or redo their work, American companies would spend an additional one billion dollars per week!

Activity 1 - Find Your Twin (continued)

Directions:

1. You will each be given a card with a drawing of a GMP board (Good Manufacturing Procedure) on it.

2. One, and only one, other participant will have a GMP board that is identical to yours in every detail.

3. By carefully analyzing all the details of your board and then milling around asking and answering comparison questions about your board with other participants, find the twin for your board.

4. The person who has the twin picture of your board is going to be your partner for the next activity and so the two of you should sit down together.

5. You cannot look at another person's card until you are sure you have found a match. Analyze, ask questions and listen!

Facilitator:

Allow the participants 5-10 minutes to mill around and find their "match". Occasionally remind participants to

Hear
Interpret
Evaluate
and React to what others are saying.

Activity: 2 - Getting To Know You

Objective(s): This activity will enable participants
1. To follow simple, oral directions.
2. To practice listening and speaking skills.
3. To practice short term memory skills.
4. To become familiar with other program participants.
5. To provide insight and familiarity for the facilitator.

Materials Required:
1. List of topics

You need to know:

About Speaking - In this era of increasing diversity, it's very important to understand that a person's cultural background as well as their gender and position has a lot to do with their verbal and nonverbal communication styles.

1. Nonverbal Skills or What Do You Look Like?
   These nonverbal speaking skills make up more than one half of the meaning in any message that's being sent.
   - (a) Appearance
   - (b) Body Language-communicates even when you don't mean to
     1. positive gestures-open palms, body leaning forward, relaxed appearance
     2. negative gestures-arms crossed, hands hidden or clenched, tense appearance
     3. distance, space and touching

2. Vocal Skills and Tone or What Do You Sound Like?

3. Verbal or Language Skills or What Do You Say?

Activity: 2 - Getting To Know You (continued)

Directions:

1. You and your partner will discuss the topics that will be read to you in a moment.

2. Use what you've learned about communicating through listening and speaking during this exchange.

3. Later, you and your partner will introduce each other to the rest of the grou
using only the information you've gained through this conversation.

4. No notes can be taken. Listen and stretch your memory! Mentally arrange the information about your partner in a way that will be easy for you to remember and retell.

5. The topics are:
THE NAME THEY PREFER TO BE CALLED-ONE NAME ONLY
THEIR FAVORITE NABISCO® PRODUCT - AS A CONSUMER
THE MOST INTERESTING PART OF THEIR PRESENT JOB
ONE OF THEIR JOB DUTIES THAT THEY KNOW THEY DO REALLY WEL
FIVE OTHER DUTIES OR RESPONSIBILITIES OF THEIR CURRENT JOB
ONE THING THEY WOULD CHANGE ABOUT THEIR PRESENT JOB IF THEY COULD.

Facilitator:

Don't write the topics.
Read the list of topics at least twice and help the participants remember the topics and their order by synthesizing each topic down to one or two words,
i.e. Name
Product
Interesting Part
One Duty
Five Duties
Change

Activity: 3 - The Communication Process

Objective(s): This activity will enable participants

1. To practice listening skills, as they draw according to simple, oral directions.
2. To learn communication concepts.
3. To develop their analytical skills.

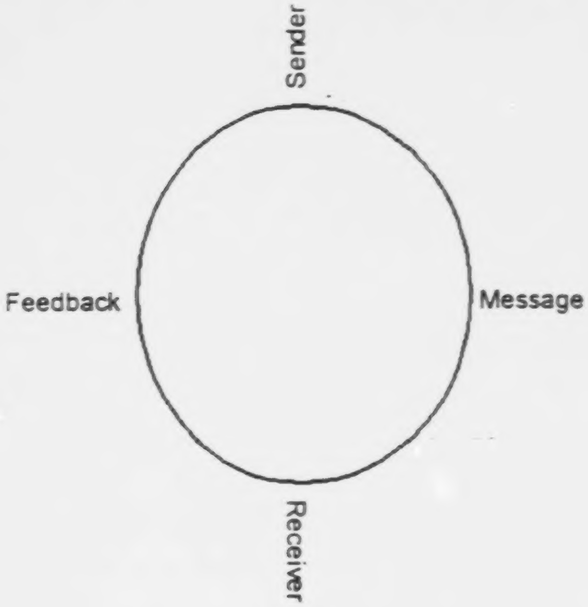
Materials Required:
Pencil or Pen

You need to know:

About The Communication Process -
Everything we do is communication. And everything we do to communicate is done either to give or get information, to control, to follow social rules, or to share feelings. The complete communication process is a closed loop which starts when a sender wants to send a message to a receiver using whatever means is appropriate and available to him. The process ends with the positive feedback that the message was received and understood.

1. Sender - the person who has information to communicate to another person.
2. Message - the actual facts or information that are communicated.
3. Receiver - the person who receives the message and responds with feedback.
4. Feedback - everything that is sent back to the sender of the message that indicates that the message was received.
5. Channel or means - the method of communication. For example, the telephone, a meeting, smoke signals, body language, etc.

Activity: 3 - The Communication Process Model


Sender
Message
Receiver
Feedback

Activity: 3 - The Communication Process (continued)

Directions:

1. On the opposite page, in the middle of the first blank space, draw a circle about 3 inches wide. It's okay that the circle is not perfectly round.

2. Outside the circle at the 12 o'clock position, write the word Sender.

3. Outside the circle at the 3 o'clock position, write the word Message.

4. Outside the circle at the 6 o'clock position, write the word Receiver.

5. Outside the circle at the 9 o'clock position, write the word Feedback.

6. Now, you have a closed loop model to use as you proceed with breaking down recent communications you've had into their parts.

7. Draw another circle in the next blank space and fill in this model with the names and one of the messages from a conversation you had today with your partner.

8. Now, in the last two spaces, draw a model for two recent work situations. One model should be of you sending a message and one model should be of you receiving a message. It's okay to use non-verbal messages. Just te us what the communication channel was.

9. We'll discuss some of these later.

Facilitator:

On the flip chart, write the words Sender, Message, Receiver and Feedback after reaching Step 1. You may want to circulate among the participants, offerin guidance to anyone who asks for help.

Later, encourage everyone to share one of their work situation communications.

Activity: 4 - Workplace Communication Problems

Objective(s): This activity will enable participants

1. To gain and practice communication barrier concept skills.
2. To develop minimum level reading and writing skills.
3. To develop and practice analytical skills.

Materials Required:
Pencil or pen

You need to know:

About Barriers in Effective Workplace Communication

1. Sender Barriers
   - -Deadlines
   - -Personal biases - expressing an opinion as if it were fact
   - -Faulty assumptions - assuming that the receiver knows more than he actually does know
   - -Ignoring or misinterpreting the receiver's feedback

2. Receiver Barriers
   - -Deadlines
   - -Attitudes
   - -Personal Biases or Perceptions

   The attitudes and perceptions of people have a lot to do with communication. Perception refers to how you see things and what your senses tell you so that what you see and hear makes sense to you. Sometimes people hear what they want to hear rather than what was really said. How you perceive or see or hear other people and their communications is a result of many factors:

   1. the physical differences between you and the person.
   2. the differences in your past experiences and backgrounds.
   3. the differences in the language used.
   4. the setting in which you're communicating.
   5. how you feel at the time of the communication.

Activity: 4 - Workplace Communication Problems (continued)

You need to know: (continued)

3. Message Barriers
   -Inaccurate or incomplete information
   -Inappropriate words
   -Environmental noise
   -Sloppy handwriting or typing
   -Torn or dirty pages of printed material

You need to know:

Ways to Overcome Workplace Communication Barriers

If you are a sender	If you are a receiver
1. Organize your thoughts and the information before sending the message. 2. Send complete and accurate information. 3. Use clear language. 4. Stay calm and, if possible, get away from noise and distractions. 5. Set realistic deadlines. 6. Ask for and listen to the receiver's feedback.	1. Listen carefully for key words. 2. Ask questions if you don't understand completely. 3. Set realistic deadlines. 4. Listen with an open mind.

Total Group
Listening

Activity: 4 - Workplace Communication Problems

Problem 1	Problem 2
Sender-	
Message-	
Receiver-	
Barriers-	
Problems-	
Solutions-	

Activity: 4 - Workplace Communication Problems (continued)

Directions:

1. As a group, we will analyze a workplace communication problem about notifying others of the needs, problems or current status of an assignment station.

2. We will follow the order of the chart on the opposite page as we discuss this problem (Problem 1). You make take notes if you'd like.

3. Afterwards, think about a workplace communication problem that you have been a part of or have witnessed.

4. Fill in Problem 2 on the chart with your workplace communication problem.

Facilitator:

Solicit several examples from the participants for Problem 1.

Several examples should be discussed in full before selecting one to be fillec in for Problem 1.

Activity: 5 - Active Listening and Removing Barriers Role Play

Objective(s): This activity will enable participants

1. To practice all the listening and speaking skills learned at this point.
2. To demonstrate an understanding of the consequences of ineffective communication (e.g. lost time, sub-standard product, etc.).
3. To demonstrate an understanding of the basic elements of effective communication.

Materials Required:
None

You need to know:

About Active Listening v. Passive Listening

Active Listening is a way of getting the sender of a message more involved with the receiver of a message. It helps everyone get the feedback and the answers they need. It is necessary for good two-way communication and for problem solving.

To get the right message, the receiver feeds the message back to the sender without adding anything to the message. It shows that the receiver has heard the message that is intended whether he agrees with the message or not. The sender will usually agree with the feedback or will send a new message that clarifies what he meant. Active listening is useful for decoding messages or getting at the hidden meanings in messages.

Activity: 5 - Active Listening and Removing Barriers Role Play (continued)

You need to know: (continued)

Steps in Active Listening

1. The sender sends a coded message.
2. The receiver receives the message.
3. The receiver decodes the message.
4. The receiver feeds back what the message is - nothing more or less - with no evaluations.
5. The sender either agrees with the receiver's interpretation or, if not, starts the message over again, clarifying the message and most likely revealing at least some of the hidden meanings in the message.

Passive Listening is the process of quietly taking in the statements and questions of the sender of a message. There is no feedback indicating that the message was received or understood.

Techniques for Listening Effectively

1. Prepare to listen by minimizing distractions and making eye contact with the sender when possible.
2. Know why and what you're listening for. What is the central idea being expressed and what are the important details?
3. Learn to recognize the ways most senders organize the information they're communicating -
   a. Chronological order - first, next, then
   b. Order of importance - most important, least significant, highest priority
   c. Comparison and contrast - like, different, in contrast, same
   d. Cause and effect - because, so, therefore
4. Look for nonverbal signals and try to determine what they mean.
5. Try to listen with an open mind even when the ideas are new and/or you don't agree with them.
6. Know yourself and your listening style. Make your style work for you or improve your listening style where necessary.

Activity: 5 - Active Listening and Removing Barriers Role Play (continued)

Directions:

1. You and your partner will develop a role play situation for a workplace communication problem that each of you has been a part of or witnessed.

2. Take turns being yourself in one role play and being the other person for your partner in another role play.

3. Nothing has to be written down.

4. Develop a "before" effective communication version of the role play and an "after" effective communication version of the same situation. In between the two versions, briefly discuss what you think were the reasons for and th consequences of the miscommunication.

5. You and your partner should be prepared to present your role plays (no more than 3 minutes each) to the entire group.

Facilitator:

Use one of the examples discussed in Activity 4 to do a role play with volunteer participants. This will guide the other participants as they develop thei own situations. Emphasis should be on reasons for and the consequences of the miscommunication.

Activity: 6 - Listening Practice

Objective(s): This activity will enable participants
1. To develop listening skills through practice.
2. To practice recording spoken information.
3. To practice remembering oral details.

Materials Required:
1. Teacher-dictated listening practice materials
2. Participant worksheets and pencil

Directions:

1. This is a practice exercise, not a test. RELAX!

2. Do your best.

3. We'll discuss problem areas when we're done.

4. Listen carefully to the directions for each exercise.

Facilitator:

This activity represents a change in pace and focus.

Although participants need to be alert, the atmosphere should be relaxed as they are developing their listening skills but not competing with each other.

The scripts for these exercises are on the page opposite the exercise.

Activity: 6 - Listening Practice Worksheet

Facilitator:

Dictation for Exercise b - Like and Don't Like

John and Mary like computers.

Bob likes Monday start-up but doesn't like Saturday clean-up.

Ann likes Saturday clean-up but she and Mary don't like overtime.

Although John likes overtime, he and Mary don't like Saturday clean-up.

Bob likes overtime.

Although Mary likes Monday start-up, Ann and John don't like it at all.

Total Group
Listening

Activity: 6 - Listening Practice Worksheet

a. **Make a ✓ on the number you hear.**

a. 10 [✓ 11] 100
b. 12 [✓ 20] 22
c. 3 13 [✓ 30]
d. [✓ 4] 14 40
e. 5 15 [✓ 50]
f. 6 [✓ 16] 60
g. [✓ 7] 17 70
h. 8 18 [✓ 80]
i. [✓ 9] 19 90

b. Make a ✓ when you hear **like**.
Make an **x** when you hear **don't like**.

	Overtime	**Computers**	**Saturday Clean-Up**	**Monday Start-Up**
Ann	X	✓	✓	X
Bob	✓	✓	X	✓
John	✓	✓	X	X
Mary	X	✓	X	✓

c. **Listen and circle the number you hear:**

555-4212	555-4202
311-9762	**311-9752**
254-8976	254-9976
778-2056	778-2046
626-5339	**636-5339**
255-9509	251-9509
782-8886	**872-8886**
874-0402	**874-0482**

Activity: 6 - Listening Practice Worksheet

Facilitator: Read the entire number.

d. **Listen and write the missing numbers.**

7**20-1206**-8524

928-**7191-75**34

413-25**32-6987**

976-4445-7160

753-**3113-41**42

835-27**42-2553**

6**43-6263**-7045

591-**0402-82**38

e. **Listen and write the lot ID number you hear.**

0882260000

0901410000

0883620000

0879650000

0914320000

0782320000

0699470000

0714320000

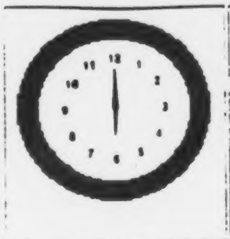
Activity: 6 - Listening Practice Worksheet

f. Listen and circle the number you hear:

1%	.1%	[✓ .01%]	10%
2%	20%	.2%	[✓ .02%]
3%	30%	[✓ .3%]	.03%
40%	[✓ 4%]	.4%	.04%
50%	5%	.5%	[✓ .05%]
60%	6%	[✓ .6%]	.06%
70%	7%	.7%	[✓ .07%]
[✓ 80%]	8%	.8%	.08%
90%	9%	[✓ .9%]	.09%

Activity: 6 - Listening Practice Worksheet

g. Listen and identify the time you hear.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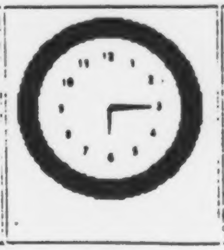
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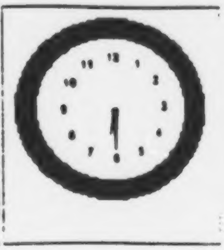
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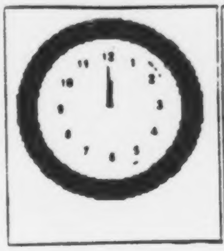
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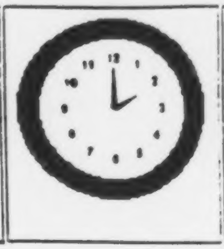
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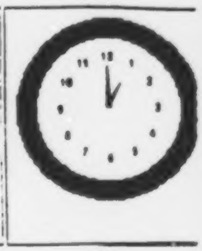
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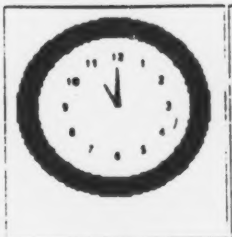
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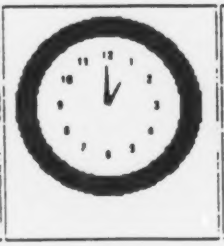
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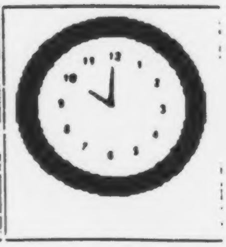
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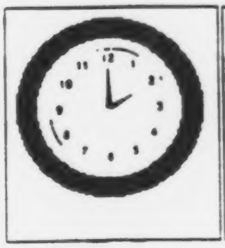
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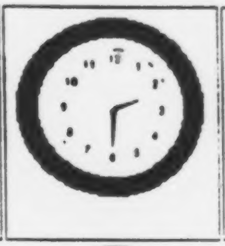
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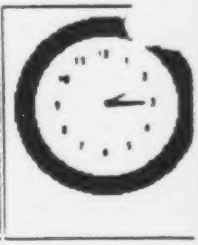
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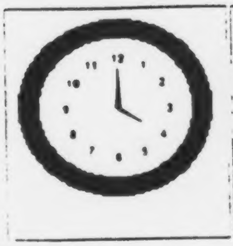
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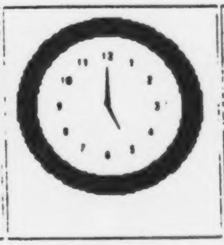
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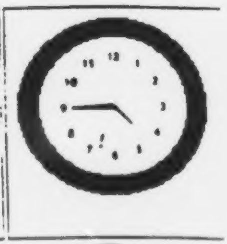
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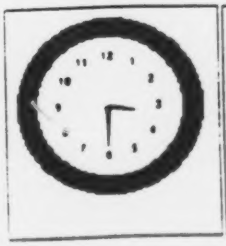
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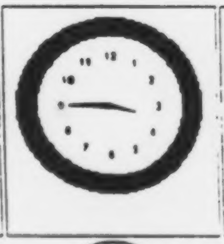
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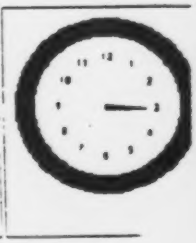

6. c

Activity: 6 - Listening Practice Worksheet

h. Listen and circle the address you hear.

1. **655 Broad Street** 665 Broad Street
2. **82 East Avenue** 83 East Avenue
3. 428 Pine Street **448 Pine Street**
4. 144 Brook Road **1404 Brook Road**
5. **139 Lake Avenue** 129 Lake Avenue
6. **5206 Main Street** 5026 Main Street
7. 5790 Plum Street **5719 Plum Street**
8. **4304 Laburnum Avenue** 434 Laburnum Avenue

i. Listen and write the missing numbers.

1. 3**42** Franklin Street
2. 12**20** Carolina Avenue
3. **41**1 Bay Road
4. **78**68 Grand Avenue
5. 76**63** First Street
6. 5**05** River Road
7. **18**92 Madison Avenue
8. 2**17** Penny Lane

Activity: 6 - Listening Practice Worksheet

Facilitator:

k. Ask after the food order dictation.

   a. How many french fries were ordered? - **3**

   b. What kind of sandwich was on rye bread? - **ham and swiss**

   c. Should the tuna salad or chicken salad have mayo? - **tuna salad**

   d. Was there an equal number of sandwiches and sodas? - **yes, 3 of each**

   e. Was the chicken salad sandwich on wheat bread? - **no, on white**

   f. Was this a take out order? - **yes**

Activity: 6 - Listening Practice Worksheet

j. Listen and write the number you hear.

1.	**work order number**	**21117**
2.	**lot ID**	**0545155000**
3.	**extension**	**4412**
4.	**assignment stations**	**816, 698 and 713**
5.	**a salt reading of**	**.02%**
6.	**a dough temperature of**	**78°**

k. Food Order Dictation

Take notes as needed to help you remember the items.
Visualize each item as you hear it.

1 chicken salad on white, hold the mayo

1 tuna salad on wheat toast

1 ham and swiss on rye

3 large orders of fries

2 colas

1 diet ginger ale

an order of onion rings

to go

Activity: 6 - Listening Practice Worksheet

Facilitator:

I. Ask after the dictation

a. Which ingredients do we need 1 gallon of ? - **almonds and soy nuts**

b. Do we need whole or sliced almonds? - **Neither, we need slivered almonds**

c. Do we need ½ gallon or ¾ gallon of coconut? - **½ gallon**

d. How many total gallons of sesame seeds and sunflower seeds do we need? - **1 total gallon**

e. Would 6 cups of maple syrup be too much? - **No, 8 cups are needed**

f. True or false - 8 cups of raisins are needed - **False, 8 pounds of raisins are needed**

g. The primary ingredient in this recipe is ________? - **Rolled oats - 3½ gallons.**

h. True or false - It takes 75 minutes in a 360° oven to bake the granola. - **False, it takes 45 to 60 minutes in a 375° oven.**

Activity: 6 - Listening Practice Worksheet

I. Granola Recipe

Take notes as needed to help you remember the recipe accurately.

3½ gallons rolled oats

1 gallon slivered almonds

1 gallon soy nuts

¾ gallon buckwheat groats

¾ gallon wheat flakes

½ gallon coconut

½ gallon sesame seeds

½ gallon sunflower seeds

⅓ cup sea salt

mix

add 8 cups pure maple syrup and 6 cups soy oil

mix

spread evenly on 10 large sheet pans

bake at 375° for 45 - 60 minutes 'till golden brown

let cool

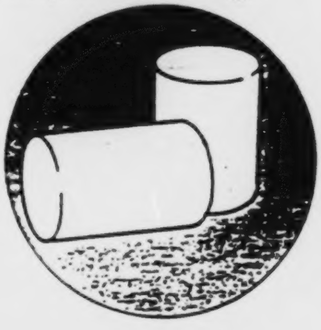
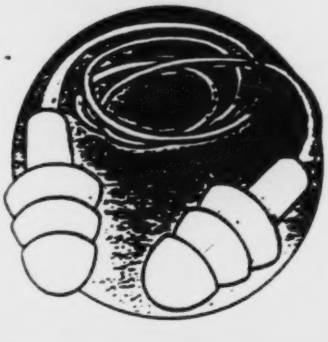
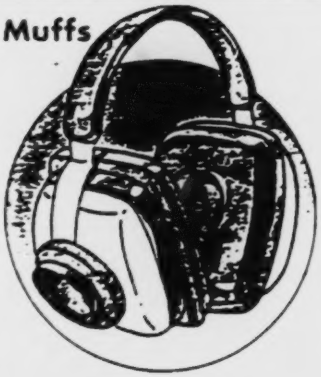
remove from trays and break down large clumps while adding 8 pounds of raisins

eat and enjoy

Activity: 6 - Listening Practice Worksheet

m. Hearing Protection Dictation

Hearing protectors block out enough noise to bring the decibel level down to a safe dose providing they fit properly. Depending on the type, brand, and **Noise Reduction Rating (NRR)** they reduce noise by about 20 to 30 decibels — often a crucial difference for your ears. Hearing protectors are required whenever noise is 85-90 decibels or more. You can also use this **rule of thumb:** if you have to raise your voice to talk to people standing only three feet away, you should probably wear hearing protectors.

TYPE	DESCRIPTION	FIT FOR SAFETY
Disposable Plugs 	Disposable plugs are placed inside the ear canal to block out noise. They are commonly made of an expandable foam. One size fits most everyone. They roll up into a thin cylinder for insertion. Once they're inside your ear canal, they expand to form a good seal.	Roll and compress the plug lengthwise between your fingertips. Reach one hand around the back of your head and pull up on the outer ear to straighten the ear canal. Insert until you feel it plugging, then **hold it in place for a moment until it begins to expand.**
Reusable Plugs 	Reusable plugs are preformed to fit the ear. They are usually made of a flexible rubber or silicon. They may be flanged or cone-shaped, and are often joined by a cord so that they're not easily lost.	Reach one hand around the back of your head and pull up on the outer ear to straighten the ear canal. **Insert the plug until you feel it sealing and the fit is comfortable.** Be sure to use plugs that are the right size for your ears. Ask your supervisor for assistance.
Muffs 	Earmuffs resemble stereo headphones. The soft plastic cushions, filled with foam or liquid, should form a good seal against noise. If you wear glasses with wide temples, you may want to choose another type of protector. If you're exposed to very loud noise, you can wear earmuffs and plugs together.	Muffs offer good protection if **the cushions fit tightly around your ears.** Check to see that the cushions are flexible and that there are no areas where the sound can penetrate. Keep your hair from underneath the cushions. Don't defeat their purpose by wearing radio earphones under them.

Activity: 6 - Listening Practice Worksheet

m. **Listen carefully to the dictation on hearing protection.**
Later, you will answer questions by filling in the blanks below with the letter of the correct type of hearing protection.

c
a
b
a
b
c
b
a
c
c

a. Disposable Plugs
b. Reusable Plugs
c. Muffs

Facilitator:

m. Based on what you heard, which type of hearing protection is described in each sentence?

c a. They look like headphones.

a b. They need to be rolled up or squeezed before going into ear.

b c. They are preformed to fit the ear.

a d. They expand inside the ear canal.

b e. They are usually made of rubber or silicon.

c f. They are filled with foam or liquid.

b g. They are often joined by a cord.

a h. They are made of expandable foam.

c i. They may not work well with eyeglasses.

c j. They are not put inside the ear canal.

Total Group
Listening
BLUE -
MODERATE LEVEL

Activity: 6 - Listening Practice Worksheet

n. Directions for Surviving a Hotel Room Fire

Jot down only the key words you need to remember the directions you'll hear. Try to group the items in a way that makes sense to you - similar topics (using the phone), order of importance, etc. Try to picture these directions in your minds eye.

1. Use the phone to give your location to the front desk.
2. If you need to let the smoke out of your room, open a window.
3. If smoke is coming into your room from outside, keep the window closed.
4. Fill the bathtub with water for fighting the fire.
5. Turn on the bathroom fan.
6. Stuff wet towels and sheets in the cracks of the door and walls.
7. Use the ice bucket to wet the door and walls if they get hot.
8. Cover your mouth and nose with wet towels to filter the smokey air.
9. Move flammable things away from the windows and doors and keep those things wet.

Facilitator:

Read the instructions for this exercise to the group. It's important to point out to the participants to listen first and then group items together in a way that will help them remember what they heard. After dictating the directions, ask for volunteers to give the directions back to you. Ask how they grouped the items i order to remember them easily.

Activity: 6 - Listening Practice Worksheet

o. **Directions for Emergency Medical Care at Nabisco**
Again, jot down only the key words you need to remember the directions you'll hear. Try to group the items in a way that makes sense to you and that will be easy for you to remember.

____

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Facilitator:

This exercise, like Exercise n, should focus on developing a method to use in remembering spoken details. Ask volunteers how they grouped the items in their mind in order to remember them easily.

Total Group
Listening

Activity: 6 - Listening Practice

o. Emergency Medical Care Procedures

These procedures apply when no nurse is on duty in the Medical Department.

1. Call Security (EXT.4272) to open Medical Department.

2. Control bleeding - large dressings are in Medication Room in drawer marked emergency dressing.

3. Arrange transportation:

   A) Call Rescue Squad if seriously injured or Life Support if severe emergency. Otherwise, call Groome Transportation or East End Cab. Give one ticket for trip out and one ticket for return trip. Tickets are on the nurse's desk in Medical Department.
   B) Injured employees are not to drive themselves under any conditions.
   C) No other employee is to drive an injured employee to medical care.

4. Notify medical facility chosen that injured person is in transit. Give name of employee and specifics of accident.

5. Instruct employee to give hospital the following information:

   A) Order for Medical treatment slip (on nurse's desk).
   B) Identify as Nabisco employee and Worker's Compensation.
   C) Dr. Dale Slagel is plant physician.

6. Notify or help injured employee contact family if desired.

7. Instruct injured employee to report to Medical Department prior to returning to work.

8. If specialist is needed, Stuart Circle Emergency Room has specific instructions as to which specialist to use.

9. Leave a note in Medical giving employee's name, type of injury, and medical facility used.

Activity: 6 - Listening Practice Worksheet

p. **Listen carefully to the newspaper article about a bakery.** Try to remember as many facts as you can. Also, listen for the main ideas and for the order of the production process. Be prepared to answer questions on the article. You may take notes as you'd like.

Facilitator:

Be sure to give the participants a break beforehand in preparation for this long dictation.

Tell all participants that some questions on the dictation will require recognizing or recalling facts. Other questions will require understanding the concepts and process talked about in the article.

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Sweet situation

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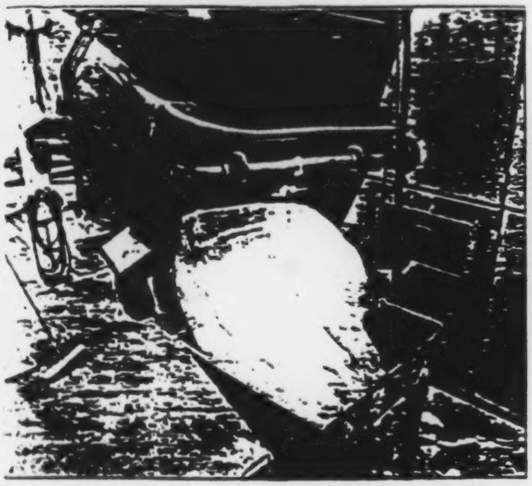


DOUGHY FUN. Mike McMasters operates a special motorized hoist, which places the dough in a machine that rolls it out into a wide sheet ready to be cut into doughnuts.

A look behind the scenes at the Dunkin' Donuts factory

PHOTOS BY P. KEVIN MORLEY
STORY BY GREGORY J. GILLIGAN
TIMES-DISPATCH STAFF

After 21 years on the job, Tom Carroll knows a lot about making doughnuts.

He used to get up early each morning to roll out the dough, cut it by hand and then dip it into hot oil to make dozens of doughnuts at a Dunkin' Donuts store.

Carroll still gets up early — at 4 a.m. — to go to work, but now a machine does much of the work for him and others.

In fact, the system that Dunkin' Donuts Inc. recently began using at its new central bakery in Richmond makes thousands more doughnuts than Carroll and his fellow workers could ever make by hand.

"I know what doughnuts are supposed to look like and taste like, and there's no difference with these than with the ones I used to make by hand," Carroll said. "They're good."

Instead of making doughnuts at each store — a time-consuming process that requires a large number of workers — Dunkin' Donuts, the country's largest doughnut retailer, decided to test a new concept using a central bakery. Under this concept, the company would lower production costs and expand its sales outlets by distributing its products from the bakery.

HOT ACTION. Doughnuts are fried in vegetable shortening for 45 seconds on each side. Mike McMasters checks to make sure each is flipped over.

ZAPPED. With the help of a machine, Wanda Dickens squirts raspberry filling into the doughnuts.

30,000 made daily

In late February, the chain opened the $1.5 million production facility in the Dabney Center industrial park, north of West Broad Street near Westwood Avenue.

There, about 30,000 doughnuts — or 2,500 dozens — are made daily and shipped twice a day currently to 11 stores in the area.

The bakery eventually will be able to produce more than 15,000 dozens daily and will distribute to as many as 30 outlets.

"And we still make up to 30 different varieties of doughnuts every day," said Terry Soley, Dunkin' Donuts' area manager, who oversees operations at the bakery and company-owned stores. "That's impressive when you consider they're being made from a central facility."

◆ ◆ ◆

It takes about an hour and a half to make a doughnut at the Dunkin' Donuts bakery — from the moment workers begin mixing the dough until frosting or colorful sprinkles are put on the doughnuts at the end of the process.

Workers begin arriving at 8 p.m. to make doughnuts that will be ready for sale in stores that will open at 6 the next morning.

About 70 percent of the goods that Dunkin' Donuts sells daily is produced on that 8 p.m. to 4 a.m. shift. A second shift arrives around 5 a.m. and works until 1 p.m.

By midnight — or 9 a.m. on the second shift — doughnuts are rolling off the conveyor belts like a steady rainfall. The aroma from the doughnuts is pervasive, even blocks outside of the building.

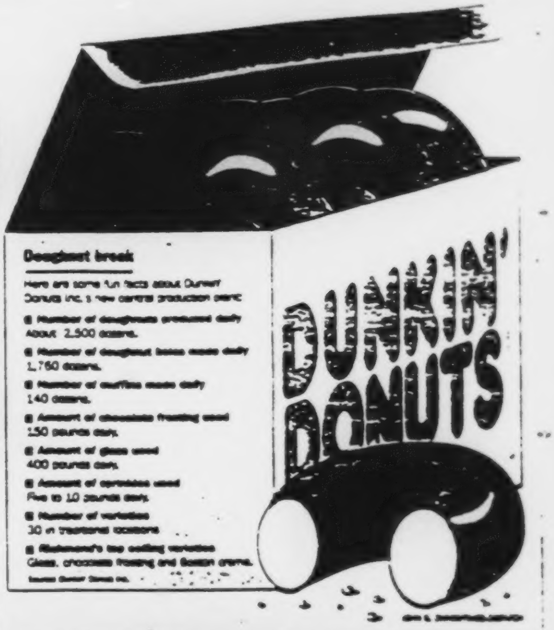
The process starts with a bag of yeast flour — about 10,000 pounds are used weekly — that is mixed with water to make the dough.

After about 16 minutes of mixing, the dough is put through an extruder that rolls the dough into a one-half inch thick sheet. From there, the dough goes to a machine that cuts it into ring doughnuts or shell doughnuts for filling.

The newly formed doughnuts then fall onto a conveyor belt, where employees, like Carroll, check each one.

"It's like Lucy at the chocolate factory," said William Bode, the chain's retail sales manager, referring to an "I Love Lucy" television episode in which Lucille Ball and

PLEASE SEE DUNKIN', PAGE E14 ▶

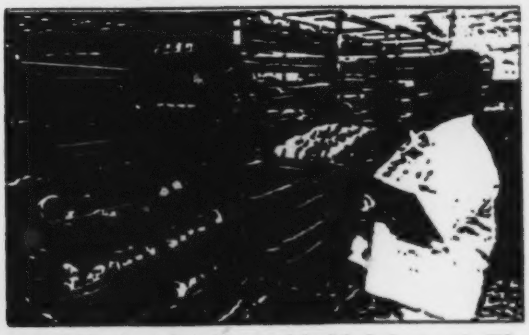


Doughnut break

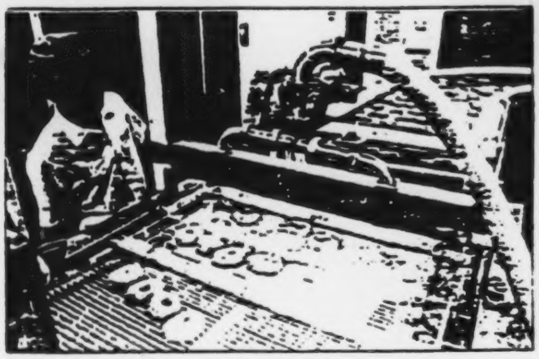
Here are some fun facts about Dunkin' Donuts Inc.'s new central production plant:

- Number of doughnuts produced daily
  About 2,500 dozens.
- Number of doughnut holes made daily
  1,760 dozens.
- Number of muffins made daily
  140 dozens.
- Amount of chocolate frosting used
  150 pounds daily.
- Amount of glaze used
  400 pounds daily.
- Amount of sprinkles used
  Five to 10 pounds daily.
- Number of varieties
  30 in traditional locations.
- Richmond's top selling varieties
  Glaze, chocolate frosting and Boston creme.

Source: Dunkin' Donuts Inc.



READY TO ROLL. Donnie Black slides a tray of glazed doughnuts onto a rack, which later is placed on a truck for delivery to area stores.



GLAZE WATERFALL. Alphonso Meredith watches as glaze is sprayed on each doughnut.

COVER STORY

Dunkin' Donuts cookin' with central bakery

Concept was tested in markets such as Las Vegas, Boston

DUNKIN' DONUTS
It's worth the trip.

P. KEVIN MORLEY/TIMES-DISPATCH

ON THEIR WAY. Dunkin' Donuts trucks deliver doughnuts and other goods to 11 outlets in the Richmond area.

▼ **DUNKIN'** *FROM PAGE E13*

Vivian Vance were working in a chocolate candy factory.

Doughnuts then are placed onto moving trays that go through an enclosed box of moist heat so the dough can rise for 35 minutes before heading to the fryer.

A waterfall of glaze

What's next? The doughnuts are dropped into hot vegetable shorting, where they float for 45 seconds on each side — enough time to get a golden coating.

"You've got to watch to make sure that all of the doughnuts are flipped," worker Mike McMasters said as he turned over a couple of doughnuts.

Then it is time for the doughnuts to go through a waterfall of glaze before spending the next 30 to 45 minutes on a spiral cooling conveyor.

The last step is the finishing section, where the ring doughnuts get a coating of frosting or powered sugar and the shell doughnuts are zapped with lemon or cherry filling.

"My friends ask me all the time how we get the fillings inside them," said employee Wanda Dickens. "It's easy, I tell them. All you have to do is put the doughnut up against a prong [that holds the various fillings] and squeeze it and it fills it up."

All along the process, employees can — and are encouraged to — eat doughnuts. McMaster's favorite, for instance, is the chocolate honey dipped.

Even Soley, who has been working for the Dunkin' Donuts chain for 31 years, walks into the production plant and grabs at least one doughnut a day.

"I still love them," Soley said.

In the center of the 12,000-square-foot production plant, Dunkin' Donuts employees make — and sometimes just bake — five varieties of muffins, three types of croissants, three kinds of bagels and four varieties of cookies.

35 employed at the central bakery

The 30 types of doughnuts, and the muffins, croissants, bagels and cookies are placed on racks ready to go to stores.

Trucks leave the center between 4 a.m. and 5 a.m. — for products made from the night shift — and then again between 1 p.m. and 2 p.m.

The central bakery employs about 35 workers. There are about eight to 10 people per shift, compared with about four employees needed to make doughnuts at each store.

◆ ◆ ◆

Producing doughnuts from a central bakery is not new for Dunkin' Donuts, but the scale of the operation represents a change in direction for the company.

The company chose the Richmond area to test the distribution plan because area roads allow doughnuts and pastries to be delivered to stores within 30 minutes.

Dunkin' Donuts had tested the concept on a much smaller scale in markets such as Las Vegas and downtown Boston. Those bakery operations served up to five stores, while the Richmond center will serve six times that many.

"The concept is a good one," Soley said. "We can open a lot more stores and a lot quicker than before."

That's because the central bakery allows the company to spend less on real estate and labor by building small drive-through stores and opening outlets in strip shopping centers. "We can go into nontraditional locations," Soley said.

Opportunity to broaden

The concept also gives the company extra selling points that it might use when trying to attract new franchise operators.

Instead of having to worry about buying real estate, constructing a building and then learning how to make doughnuts, now a franchisee simply would find a location and start up operations, Soley said.

"They'll leave the production side to us," he said.

Dr. David J. Urban, a marketing professor at Virginia Commonwealth University, said the new system allows Dunkin' Donuts an opportunity to broaden its network.

"And the good thing is they still maintain control over the product," Urban said. "It allows them to capitalize on their brand name while at the same time they don't have to make the investment in the real estate."

Expects to have 30 stores by 1995

There are five locally-owned franchise locations in the Richmond area, all of which make doughnuts at their stores.

The company now has 11 units — eight traditional stores and three located at gasoline stations — that are served by the central bakery.

By the end of 1995, the chain expects to have as many as 30 stores throughout the area. Four stores will open this fall.

Dunkin' Donuts will test the concept for another six months before deciding whether to roll it out elsewhere. If the concept works here, company officials say the chain could try a similar distribution system in a dozen or more other cities.

◆ ◆ ◆

A frequent question facing central bakeries such as Dunkin' Donuts' is whether the goods will be fresh when they reach consumers.

A lot of companies operate similar facilities. For instance, Ukrop's Super Markets Inc., the area's No. 1 grocer, makes all of its doughnut products at a central bakery.

Freshness is such a major concern for Dunkin' Donuts that the chain pledged not to sell any doughnuts that were made more than 12 hours earlier.

"We will sell no doughnut after its time," Bode said.

The freshness issue

Maintaining quality standards will be a challenge for Dunkin' Donuts, said VCU's Urban.

"You've got to maintain the freshness standards when you distribute to a variety of locations," Urban said. "Consumers don't want to get a dried out doughnut."

Freshness is an issue that rival Krispy Kreme Doughnut Corp. highlights. The Winston-Salem, N.C.-based chain has one store in the area, and expects to open a second on Midlothian Turnpike by late August.

Krispy Kreme stores have windows behind the counter so customers can watch doughnuts being made.

"People want hot, fresh doughnuts," said Jack McAleer, Krispy Kreme's executive vice president of sales and marketing. "That is what has made us unique. Dunkin' Donuts has to know what their customers really want, and, I'm sure, that they have done their research."

Krispy Kreme has 100 stores in the Southeast, while Dunkin' Donuts has more than 2,300 stores nationwide with annual sales of $1.2 billion.

◆ ◆ ◆

Officials from Dunkin' Donuts say they are keeping their doughnuts fresh and their coffee hot.

Customers will be the ultimate judges.

Consider an elderly Richmond couple who were eating doughnuts and sipping coffee one morning last week at the chain's store on Forest Hill Avenue.

They liked the doughnuts, even though none was made at the store.

Misses the feedback

"That's OK. These are really good," said the woman, who asked that her name and her husband's not be used.

"As long as they are fresh, that's all that matters," her husband said.

Now that he works at the central bakery, Carroll misses hearing comments like those. He also misses seeing his finished product on display at a store.

"In the retail store, you see the product and you hear the comments, but you don't get that kind of feedback here," the doughnut maker said. "But we're still making them so people are out there eating them."

Total Group
Listening

Activity: 6 - Listening Practice Worksheet

p. Newspaper Article Dictation

Facilitator:

Ask the following questions of volunteers after the dictation. Encourage participants to risk answering the questions by reminding them that we're still developing listening skills. Help participants when necessary by re-reading relevant paragraphs.

1. How many different kinds or varieties of doughnuts are made every day?
   30
2. How many doughnuts are made every day in the centralized facility?
   30,000 or 2500 dozen dozen doughnuts
3. How long does it take to make a doughnut at the centralized bakery?
   1½ Hours
4. How much yeast is used on a weekly basis?
   10,000 lbs
5. How are the fillings put into the doughnuts?
   With a prong that, when squeezed, inserts filling into the doughnut
6. In addition to doughnuts, the centralized bakery makes:
   muffins (5 kinds) **bagels (3 kinds)**
   croissants (3 kinds) **cookies (4 kinds)**
7. Why was Richmond, Virginia chosen to test the centralized facility?
   Because the areas' roads allow doughnuts and pastries to be delivered to stores within 30 minutes.
8. Who is the primary competitor for this centralized bakery?
   Krispy Kreme
9. What is the primary issue for both this centralized bakery and its rival?
   freshness
10. What has the bakery pledged to consumers?
    Not to sell any doughnuts made more than 12 hours earlier or keeping their doughnuts fresh and their coffee hot.
11. What would you say is the main idea of the newspaper article?

Activity: 6 - Listening Practice Worksheet

p. Newspaper Article Dictation

12. What was the old concept Dunkin Donuts operated under?

    Old Concept
    Company used to make doughnuts at each store

13. What was difficult about the old concept?
    -time consuming
    -large number of workers required

14. What is the new concept Dunkin Donuts operates under?

    New Concept
    Central Bakery

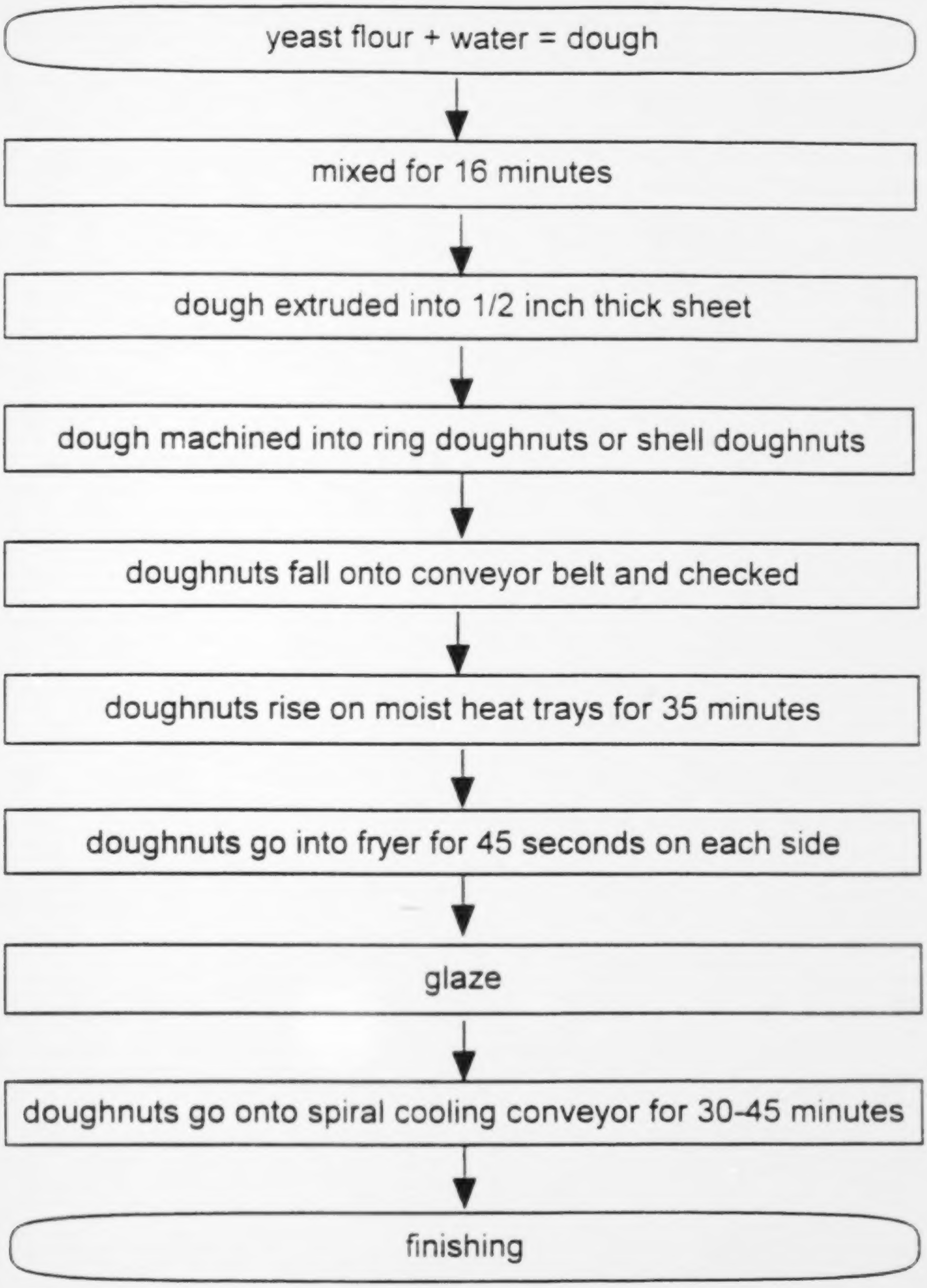
15. What are the benefits of the new concept?
    -lower production costs
    -expand sales outlets by distributing products from the bakery

Total Group
Listening

Activity: 6 - Listening Practice Worksheet

p. Newspaper Article Dictation

16. What is the production process at Dunkin Donuts?


yeast flour + water = dough
mixed for 16 minutes
dough extruded into 1/2 inch thick sheet
dough machined into ring doughnuts or shell doughnuts
doughnuts fall onto conveyor belt and checked
doughnuts rise on moist heat trays for 35 minutes
doughnuts go into fryer for 45 seconds on each side
glaze
doughnuts go onto spiral cooling conveyor for 30-45 minutes
finishing

17. How does Dunkin Donuts production process compare with Nabisco's production process?

Activity: 6 - Listening Just For Fun

q. "Once upon a time there were four people named Everybody, Somebody, Nobody and Anybody. When there was an important job to be done, Everybody was sure that Somebody would do it. Anybody could have done it, but Nobody did it.

"When Nobody did it, Everybody got angry because it was Everybody's job. Everybody thought that Somebody would do it, but Nobody realized that Nobody would do it.

"So it ended up that Everybody blamed Somebody when Nobody did what Anybody could have done in the first place."

Facilitator:

Participants can be helped in enjoying this activity if four volunteers assume the names Everybody, Somebody, Nobody and Anybody and briefly stand everytime they hear their name called as the piece is read.

This activity is intended to provide a little comic relief at the end of Activity 6.

Activity: 7 - Giving and Following Oral Directions

Objective(s): This activity will enable participants

1. To develop an appreciation for the skills involved in giving and following oral directions.
2. To practice giving and following oral directions.
3. To develop analytical skills.
4. To reinforce listening and speaking skills.

Materials Required:

1. Two different graphic designs
2. Blank paper, pencils

You need to know:

About Following Oral Directions

1. Use active listening to follow directions. To listen actively, you must
   - Give the sender your full attention and plan what you are going to do.
   - Check to be sure that you understand the directions.
   - Clarify the task that you are to do by getting more information if needed.

2. Plan the task
   - Pay attention to key words in the directions.
   - Pay attention to the order or sequence of the directions.
   - Picture yourself carrying out the directions as they are told to you.
   - Think as the sender is talking and recreate the directions in your mind.

3. Check your understanding
   When the directions have been given, check your understanding by
   - summarizing the directions
   - asking questions if necessary

Activity: 7 - Giving and Following Oral Directions (continued)

You need to know: (continued)

About Giving Oral Directions

1. Know the correct process for completing a task yourself. The people who know what they are talking about are the people who are best able to give good directions.
2. Plan exactly what you're going to say as you give the directions. Put the steps in order.
3. Think about what materials or equipment are needed to complete the task accurately.
4. Think about the receivers of your directions. Don't talk down to the receivers but don't assume that they know more than they do.
5. If completing the task involves any personal safety issues or risk of equipment damage, it's important to include precautions in your directions.
6. Check the receiver's understanding of your directions by asking him to repeat the directions or whether he has any questions.
7. Clarify your directions if the receiver is confused and unsure of what to do. Try to understand what might be leading to the confusion.

Activity: 7 - Giving and Following Oral Directions (continued)

Directions:

1. You and your partner will take turns giving and following oral directions from each other.
2. One of you should sit down with a blank sheet of paper. Your job is to draw the picture that your partner directs you to draw.
3. The other one of you will be given the picture. Your task is to explain to your partner how to draw this picture.
4. You may not rehearse.
5. You may not show the picture.
6. You may not use any visual aids.
7. You must keep your hands at your sides.

   The object is for your partner to have a picture exactly like yours when the exercise is completed.

   When you are through, discuss the experience with your partner. Analyze what made the task so difficult. What would the two of you suggest to make the task easier and to achieve a better result?

8. Now, switch roles. You will be given another picture to direct.

Task: how to ____________________

Words to explain: ________________

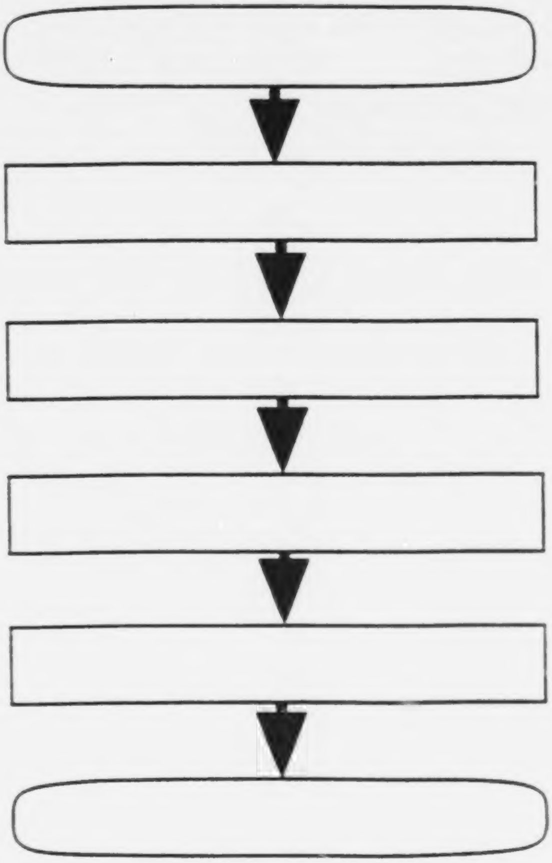
____

____

Materials needed: ________________

____

Main steps in performing the task:



Safety Warnings:

____

____

____

Task: how to ____________________

Words to explain: ________________

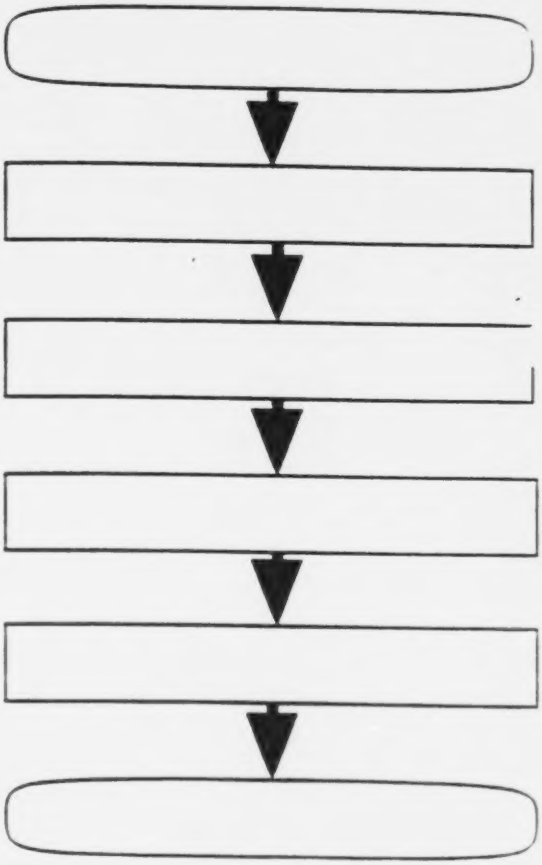
____

____

Materials needed: ________________

____

Main steps in performing the task:



Safety Warnings:

____

____

____

Activity: 8 - Planning for and Giving Oral Directions

Objective(s): This activity will enable participants
1. To develop analytical skills.
2. To reinforce all of the communication concepts to date through practice.
3. To develop minimum level reading and writing skills.
4. To develop skill in sequencing instructions.
5. To practice giving and following oral directions.

Materials Required:
1. Planning forms
2. Pencil
3. Any task materials brought by participants

Directions:

1. You and your partner were previously asked to come prepared to direct each other on a simple task from your everyday life and from your work life.

2. Use the planning form on the opposite page to help you organize your thoughts as you prepare to teach your partner these tasks.

3. When both of you are ready, take turns with your partner giving and listening to oral directions.

Facilitator:

Participants should be asked to come prepared to direct a partner in doing a task from their everyday life and from their work life. The tasks should be of the participant's choice with the stipulation that they be "doable" within the confines of the REACH program and building. For example, a participant could direct his partner on how to make a certain kind of sewing stitch, provided the participant brought all necessary materials with him to the program.

Participants who may not be prepared should be encouraged to complete a planning form with directions for wearing a dust mask or lifting heavy objects/boxes. See next page for steps.

Activity: 8 - Planning for and Giving Oral Directions

Facilitator:

Use as needed.

- Directions for Putting on a Dust Mask

1. Place the dust mask against your face with the straps hanging down.
2. Place the respirator under your chin and pull the top strap high on the back of your head.
3. Pull the bottom strap over your head and down to just below your ears.
4. Place the fingertips of both hands on either side of the nosepiece. Gentl press in until the nosepiece is molded to your nose.
5. Place both hands over the mask and breathe out. If air leaks around the mask, adjust the nosepiece or straps.

- Directions for Handling Heavy Equipment and Materials

Use proper lifting techniques when moving heavy equipment and materials:
1. get a solid foot hold
2. bend knees
3. keep back straight
4. use legs and arms to lift
5. wear gloves
6. avoid pinch points

Get help with lifting when you need it - from another person or a device suc as a dolly, hand truck, etc. Make sure lifting devices are in safe working order.

Total Group
Listening

Activity: 9 - Sequencing Oral Directions

Objective(s): This activity will enable participants
1. To develop skill in sequencing instructions.
2. To develop analytical skills.

Materials Required:
1. Set of emergency evacuation diagrams of Nabisco facility.

Directions:

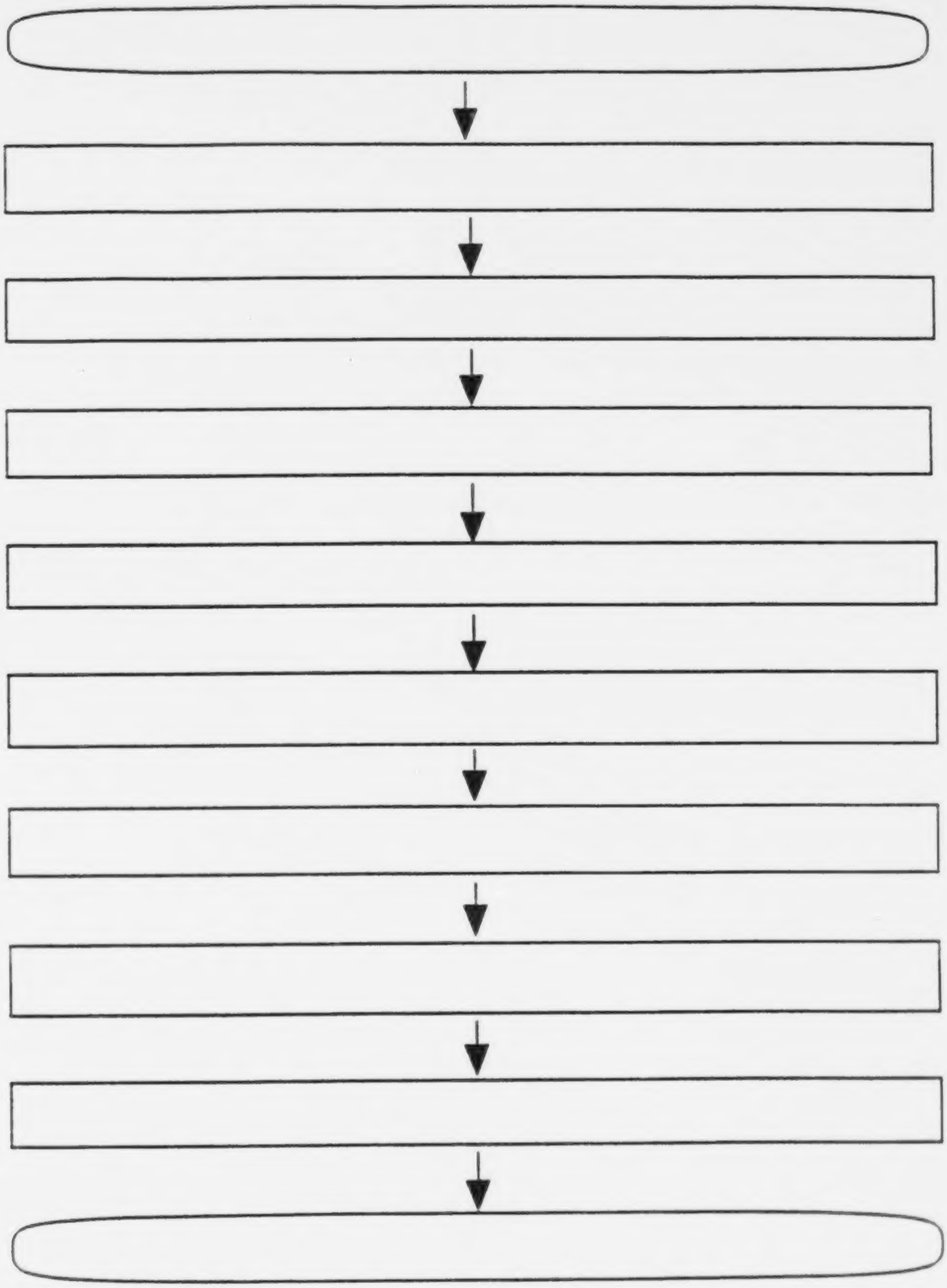
1. Study the set of diagrams on the following pages and find your work station at Nabisco.

2. Mentally plan how to give directions for evacuating the plant from your work station. Try to envision the route you should take.

3. Fill in the flow chart on the next page with directions for evacuating your work station in an emergency.

4. Be prepared to give your directions orally to other participants.

Activity: 9 - Sequencing Oral Directions
Flow Chart



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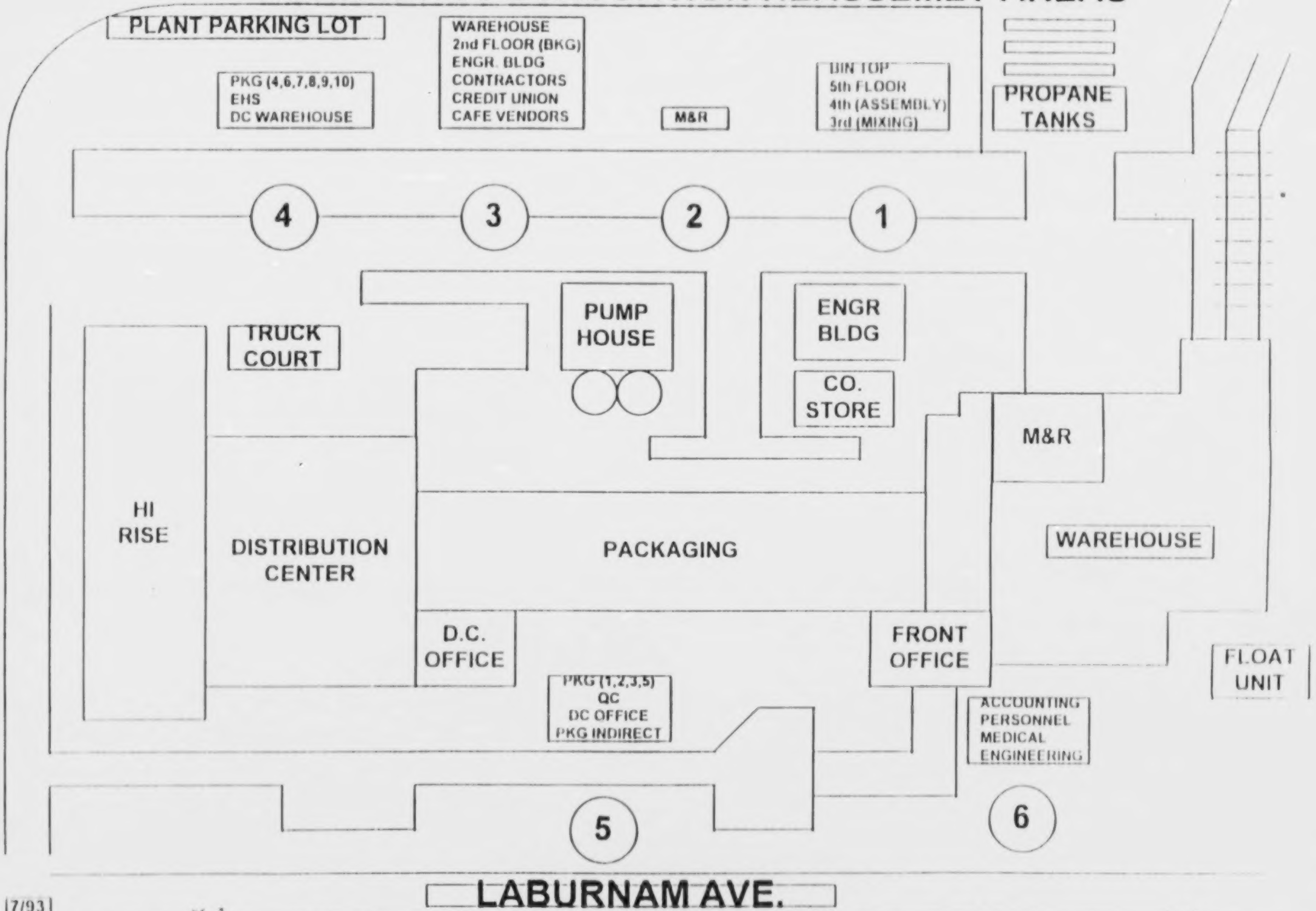
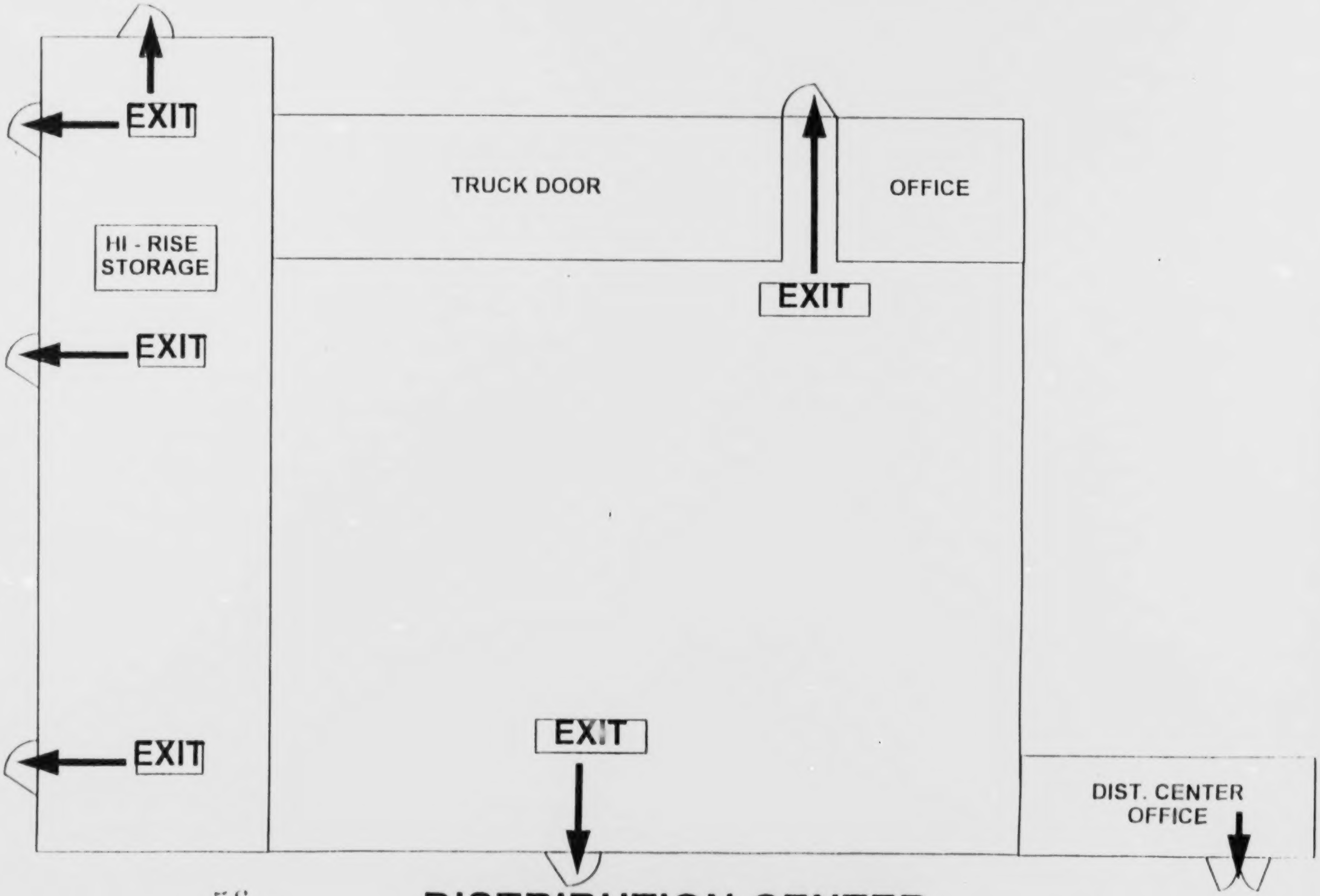
EMERGENCY EVACUATION REASSEMLY AREAS


PLANT PARKING LOT
PKG (4,6,7,8,9,10)
EHS
DC WAREHOUSE
WAREHOUSE
2nd FLOOR (BKG)
ENGR. BLDG
CONTRACTORS
CREDIT UNION
CAFE VENDORS
M&R
BIN TOP
5th FLOOR
4th (ASSEMBLY)
3rd (MIXING)
PROPANE
TANKS
4
3
2
1
TRUCK
COURT
PUMP
HOUSE
ENGR
BLDG
CO.
STORE
M&R
HI
RISE
DISTRIBUTION
CENTER
PACKAGING
WAREHOUSE
D.C.
OFFICE
FRONT
OFFICE
FLOAT
UNIT
PKG (1,2,3,5)
QC
DC OFFICE
PKG INDIRECT
ACCOUNTING
PERSONNEL
MEDICAL
ENGINEERING
5
6
LABURNAM AVE.

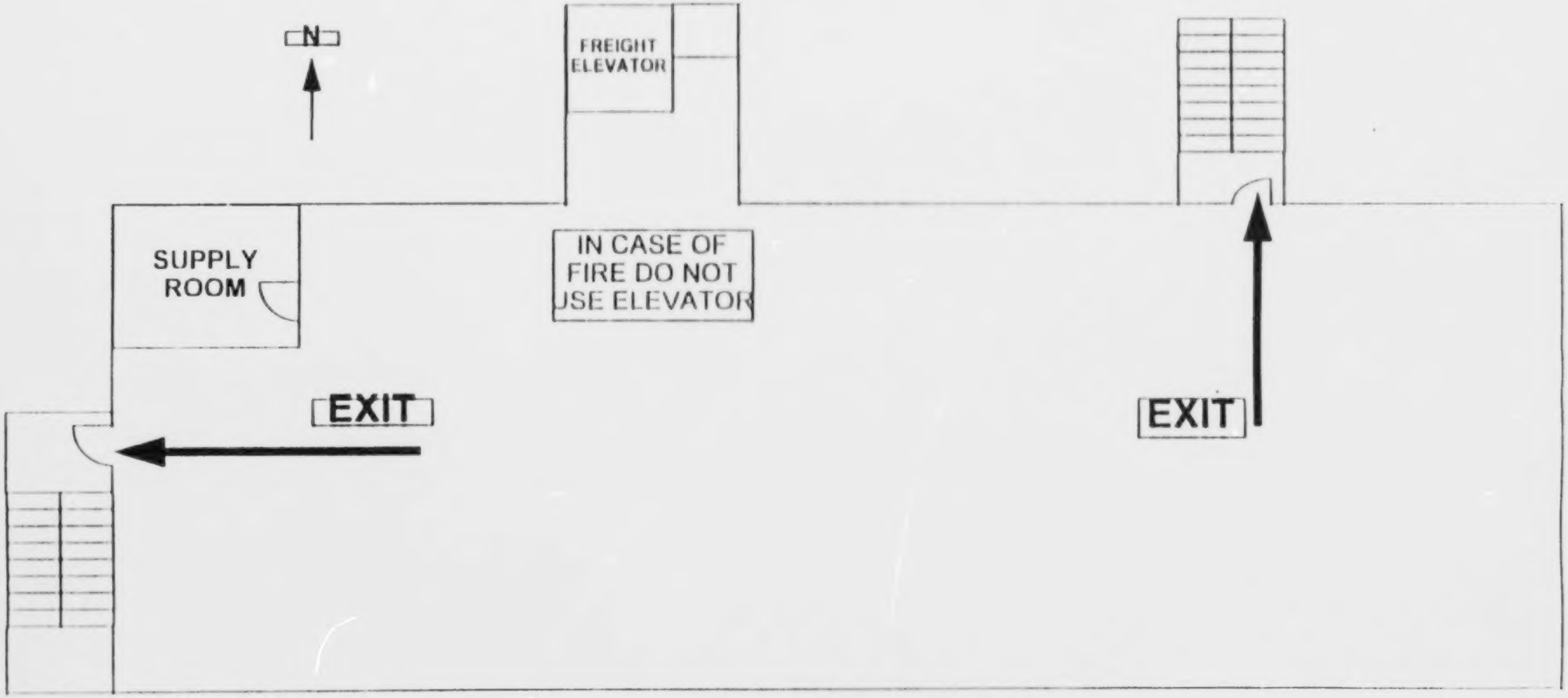
7/93


EXIT
EXIT
HI - RISE STORAGE
EXIT
EXIT
TRUCK DOOR
OFFICE
EXIT
EXIT
DIST. CENTER OFFICE

DISTRIBUTION CENTER

NABISCO, BRANDS RICHMOND BAKERY / D.C.

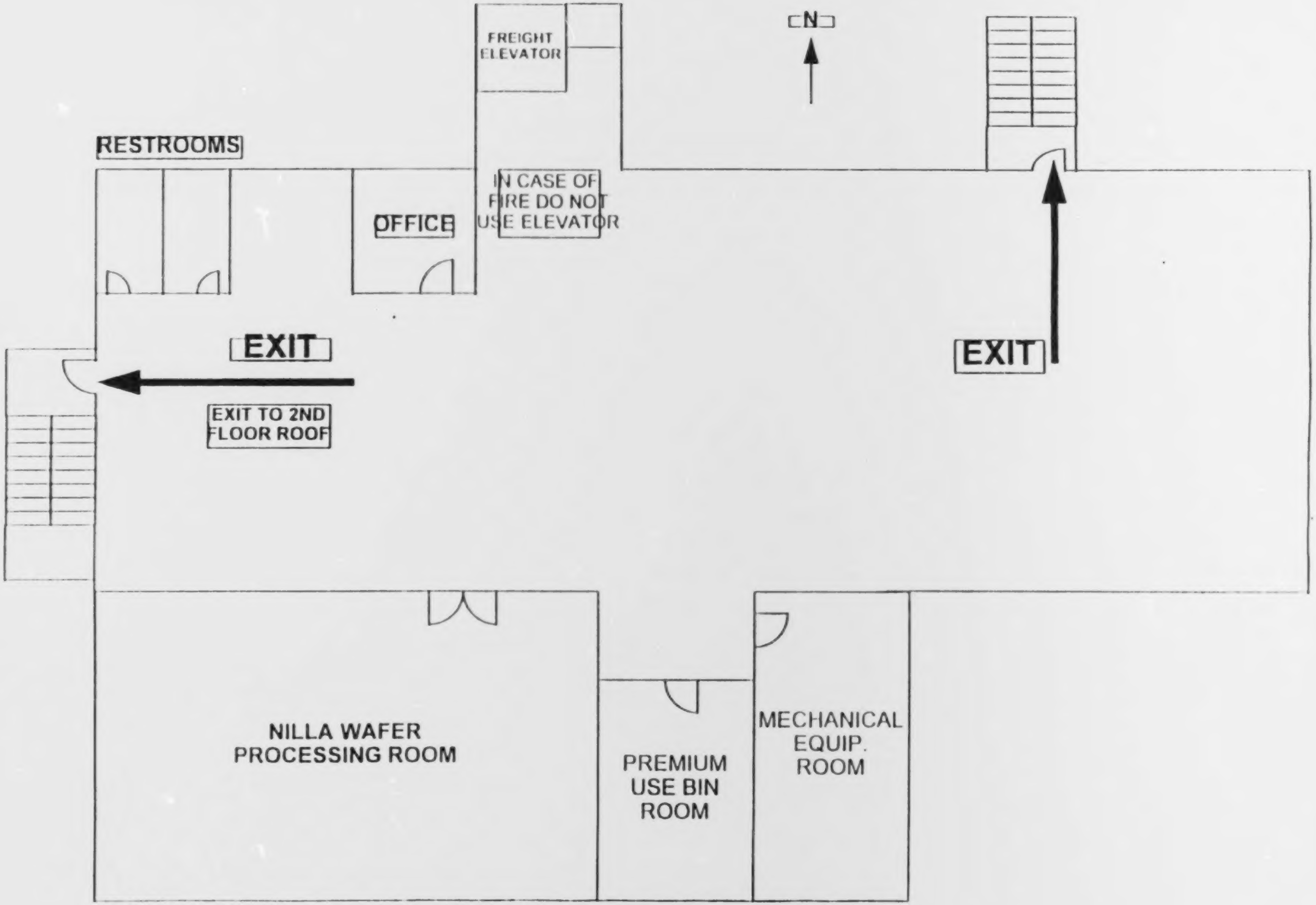
7/93


N
FREIGHT ELEVATOR
SUPPLY ROOM
IN CASE OF FIRE DO NOT USE ELEVATOR
EXIT
EXIT

5TH FLOOR - USE BIN AREA

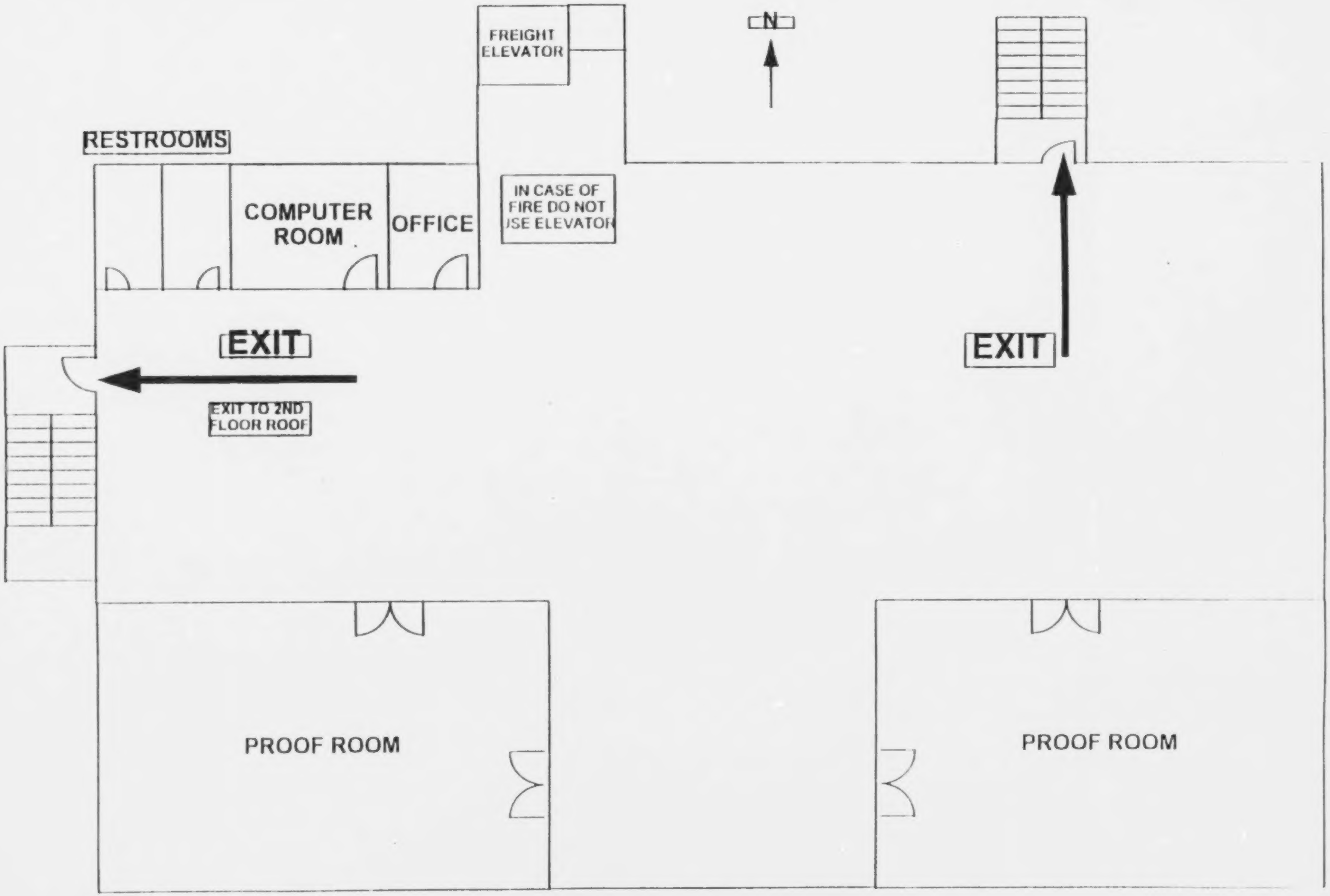
NABISCO, INC. RICHMOND BAKERY / D.C.

[7/93]


FREIGHT ELEVATOR
N
RESTROOMS
OFFICE
IN CASE OF FIRE DO NOT USE ELEVATOR
EXIT
EXIT
EXIT TO 2ND FLOOR ROOF
NILLA WAFER PROCESSING ROOM
PREMIUM USE BIN ROOM
MECHANICAL EQUIP. ROOM

4TH FLOOR - ASSEMBLY

NABISCO, INC. RICHMOND BAKERY / D.C.


FREIGHT ELEVATOR
N
RESTROOMS
COMPUTER ROOM
OFFICE
IN CASE OF FIRE DO NOT USE ELEVATOR
EXIT
EXIT
EXIT TO 2ND FLOOR ROOF
PROOF ROOM
PROOF ROOM

3RD FLOOR - MIXING

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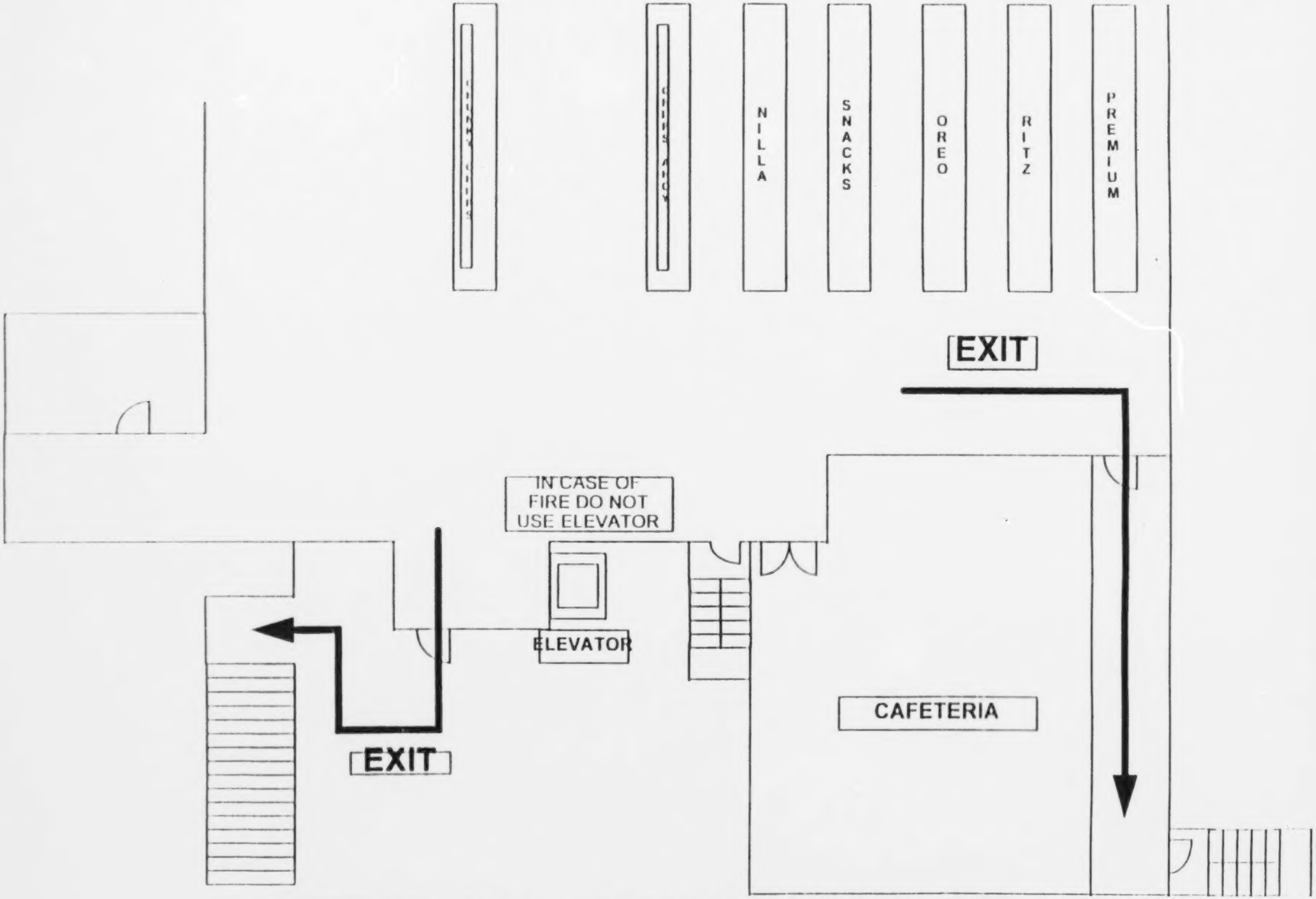
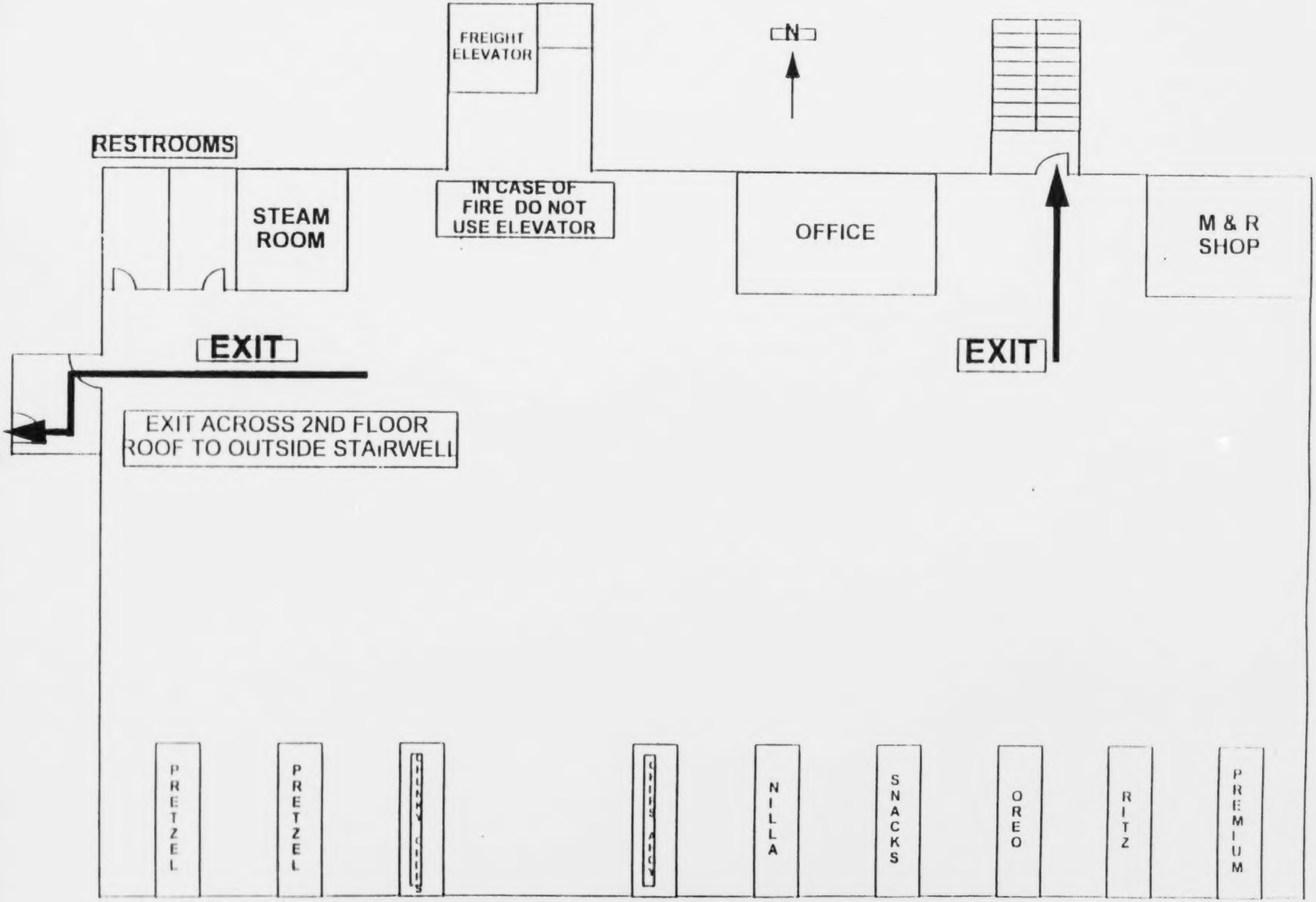

CHUNKY CHIPS
CHIPS AHOY
NILLA
SNACKS
OREO
RITZ
PREMIUM
EXIT
IN CASE OF FIRE DO NOT USE ELEVATOR
ELEVATOR
CAFETERIA
EXIT

2ND FLOOR - SOUTH BAKE SHOP

7 / 93

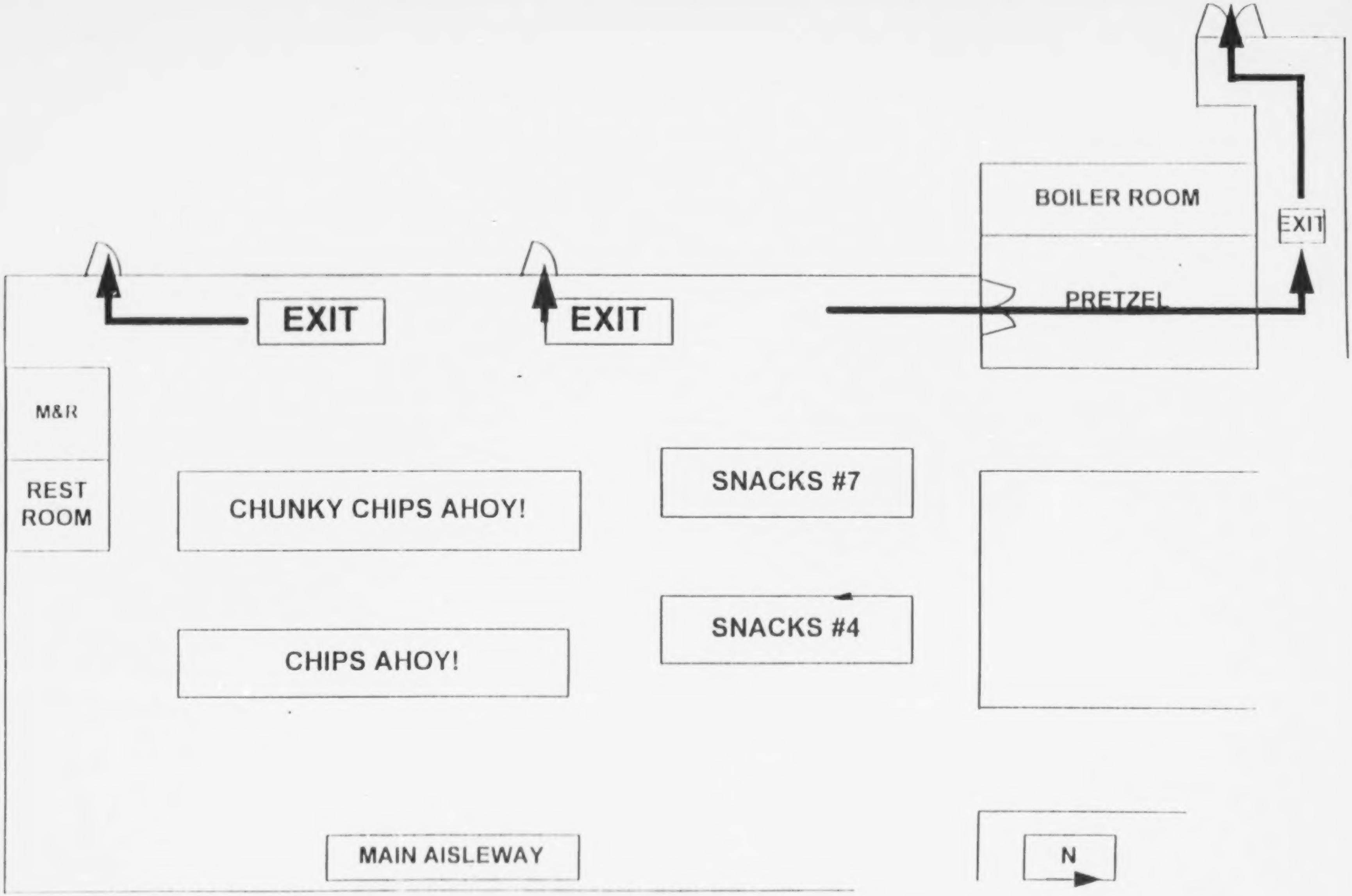
CO, INC. RICHMOND BAKERY / D.C.


FREIGHT ELEVATOR
N
RESTROOMS
STEAM ROOM
IN CASE OF FIRE DO NOT USE ELEVATOR
OFFICE
M & R SHOP
EXIT
EXIT
EXIT ACROSS 2ND FLOOR ROOF TO OUTSIDE STAIRWELL
PRETZEL
PRETZEL
CHUNKY CHIPS
CHIPS AHOY
NILLA
SNACKS
OREO
RITZ
PREMIUM

2ND FLOOR - NORTH BAKE SHOP

7/93

NABISCO, INC. RICHMOND BAKERY / D.C.


BOILER ROOM
EXIT
EXIT
EXIT
PRETZEL
M&R
REST ROOM
CHUNKY CHIPS AHOY!
SNACKS #7
SNACKS #4
CHIPS AHOY!
MAIN AISLEWAY
N

1ST FLOOR - WEST PACKING DEPT.

7/93

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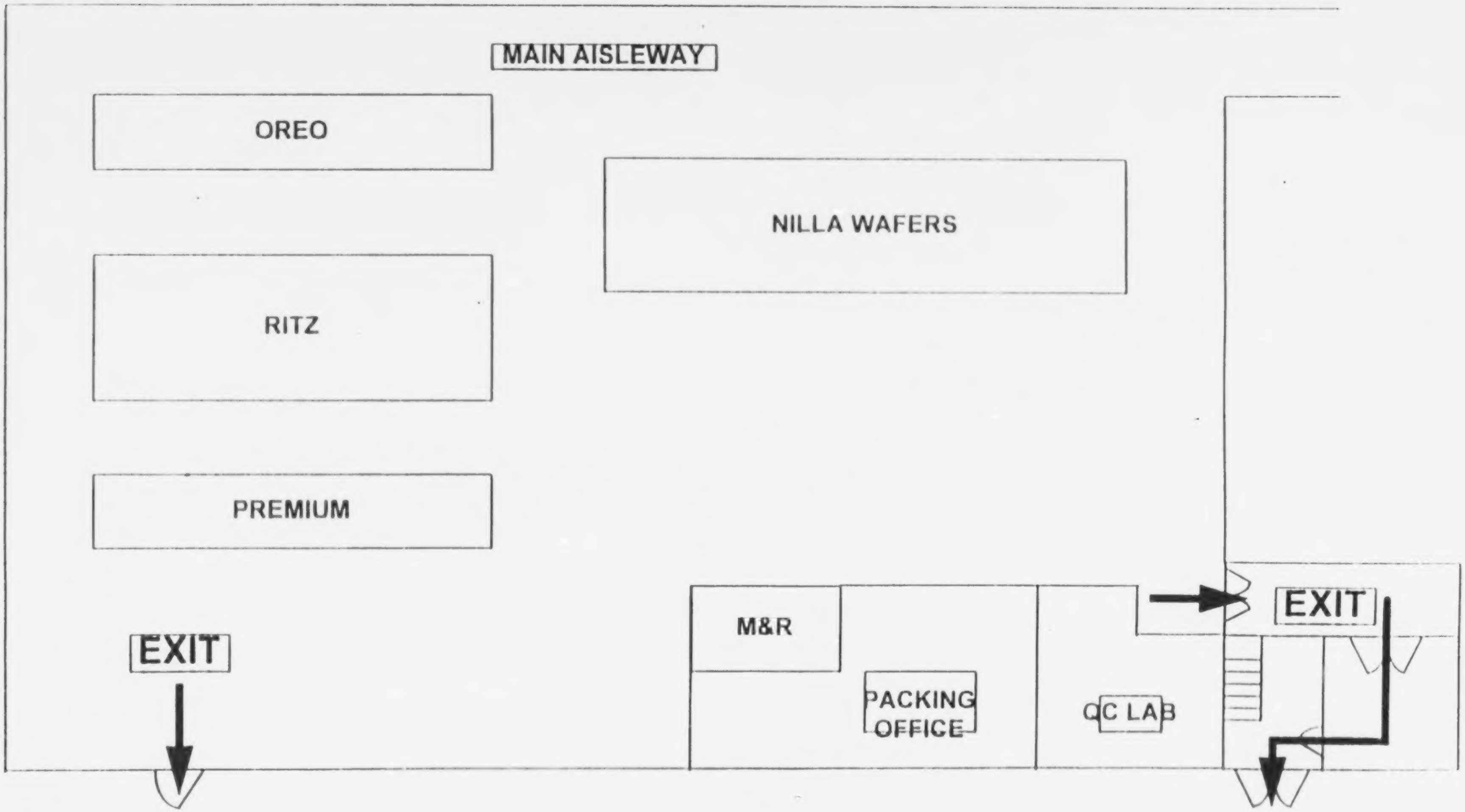
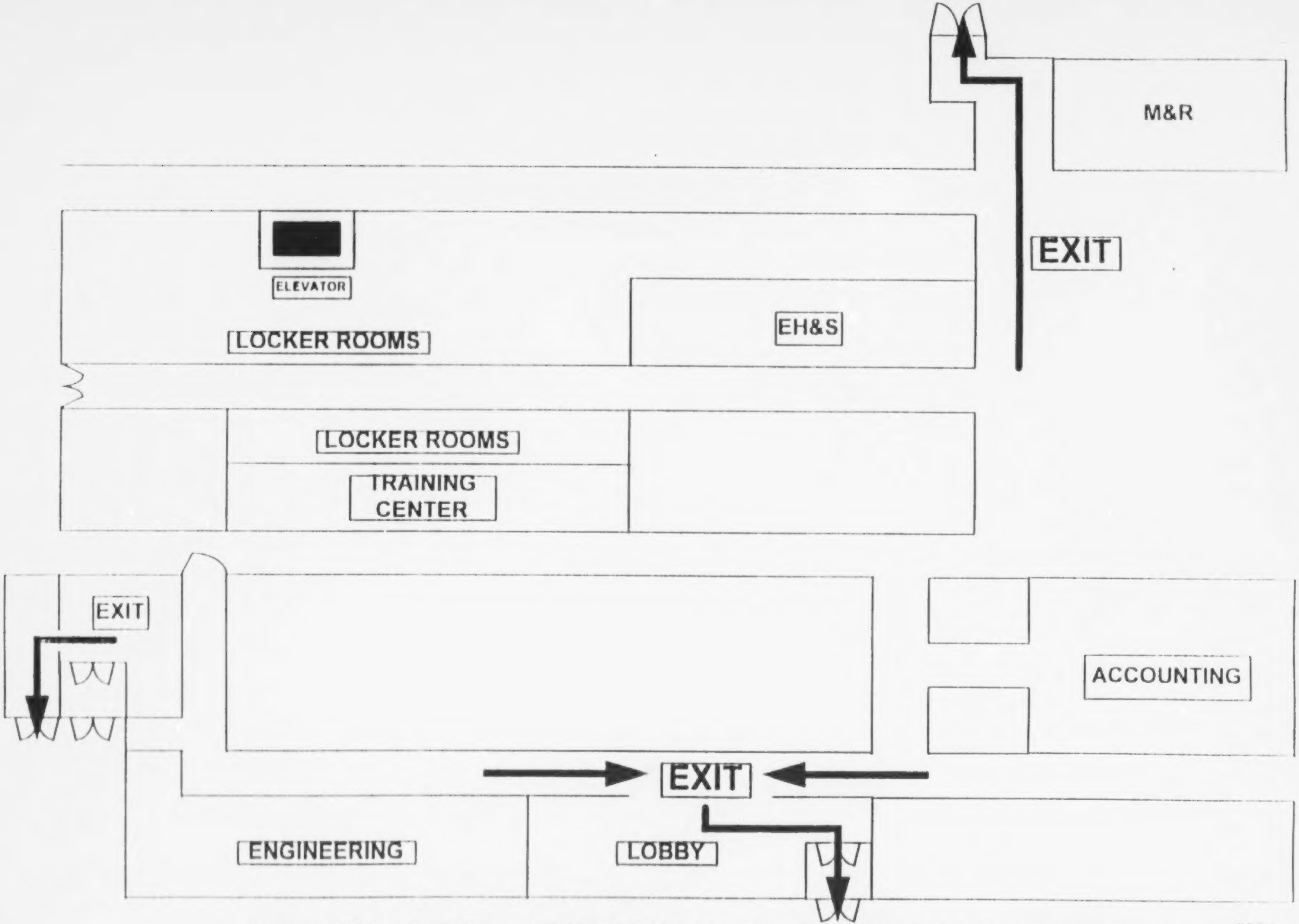

MAIN AISLEWAY
OREO
NILLA WAFERS
RITZ
PREMIUM
EXIT
M&R
EXIT
PACKING OFFICE
QC LAB

1ST FLOOR - EAST PACKING DEPT.

NABISCO, INC. RICHMOND BAKERY / D.C.

7/93


M&R
EXIT
ELEVATOR
EH&S
LOCKER ROOMS
LOCKER ROOMS
TRAINING CENTER
EXIT
ACCOUNTING
EXIT
ENGINEERING
LOBBY
N

1ST FLOOR - BAKERY OFFICE,EH&S,M&R

NABISCO, INC RICHMOND BAKERY / DC

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Activity: 10 - Giving and Receiving Oral Directions

Objective(s): This activity will enable participants

1. To practice giving and following oral directions.
2. To reinforce all of the communication concepts learned to date.
3. To develop analytical skills.
4. To develop skill in sequencing instructions.

Materials Required:

1. Large folding map of Metropolitan Richmond area for each participant
2. Set of emergency evacuation diagrams of Nabisco® facility.

Directions:

1. You will be working with a partner. Choose one of the activities below.

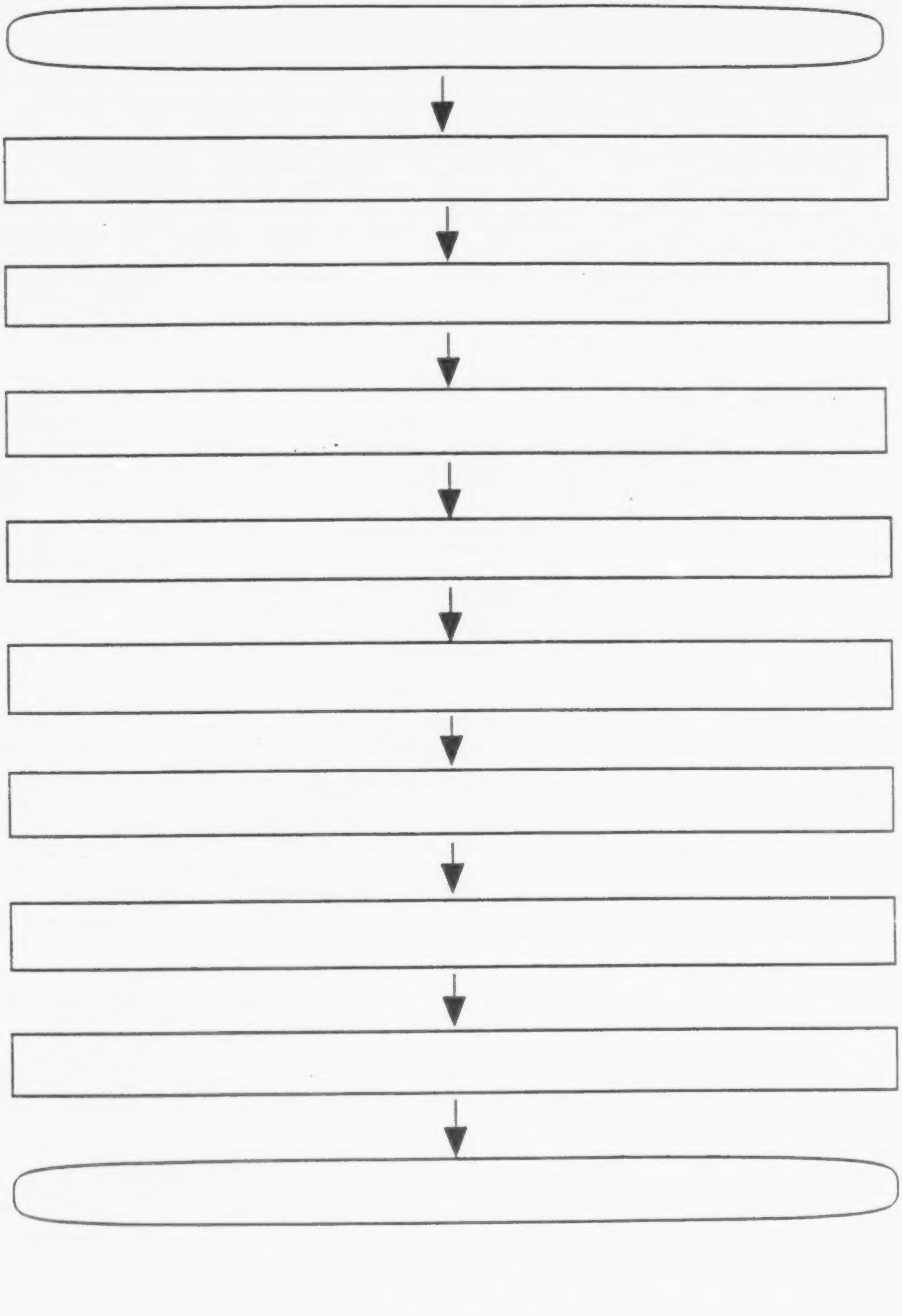
2. The object is for you to plan and give oral directions that are so clear and easy to follow that your partner, using effective and active listening techniques, will reach a predetermined point known only to you.

3. Remember the techniques you've learned for giving directions.

Activity A:
Study the map you've been given and plan (doing a flow chart) how to give oral directions for driving from the work site to your home. If you prefer, you could give directions for getting to a public place such as the baseball park, one of the regional shopping malls, etc. but do not tell your partner what the destination is.

Activity B:
Use the set of emergency evacuation diagrams again as a guide and draw a map showing how to get from the employee parking lot to your work station. Do a flow chart that shows the steps in sequence.

Activity: 10 - Giving and Receiving Oral Directions
Flow Chart



Total Group
Listening

Activity: 11 - Getting Information Orally

Objective(s): This activity will enable participants
1. To practice asking and answering questions to get information they need.

Materials Required:
Information gap activity worksheets
Pen or pencil

You need to know:

About Asking Questions

1. Decide what information you need to have about a situation by asking the "five W's and how" questions to yourself first. Examples:
    a. Who (should page the mechanic when one is needed?)
    b. What (should I do if the ovenband stops?)
    c. When (should I do a cream-up?)
    d. Where (should I check to see which bins need to be fumigated?)
    e. Why (did the belts shut down and the red light start flashing?)
    f. How (many doughs are in the proof room?)

2. You need answers to the "five W's and how" questions in order to do your job effectively and when you don't have those answers, you have an information gap.

3. To close or fill in your information gap, determine who is the best or most likely person to have the answer(s) you need.
    a. Co-workers in the same department
    b. Co-workers in another department
    c. Your internal customer or the person who gets the product after you've done your job.
    d. Your supervisor

4. Generate your questions by
    a. Planning ahead exactly what information you need.
    b. Asking your questions as clearly as you can.
    c. Listening carefully to the answer(s) you get.
    d. Taking notes if necessary.
    e. Evaluating the answers in light of your job.
    f. Repeating the cycle if necessary.

Activity: 11 - Getting Information Orally (continued)

You need to know: (continued)

5. There are two basic kinds of questions:
   a. Open questions don't require a specific answer. People often include their opinions, thoughts and feelings. Example - How should I prepare to measure product breakage?

   b. Closed questions are narrow and usually require a specific answer. People tend to answer closed questions in a direct way, often in a single word or sentence. Example - Should I enter the empty bag weight into the computer?

Directions:

1. You and your partner will have different information for the same incom graphics.

2. Each of you must correctly fill in your graphics by getting the missing information from your partner through the questions you ask.

3. You should not look at your partner's information.

4. Carefully analyze the information you do have first.

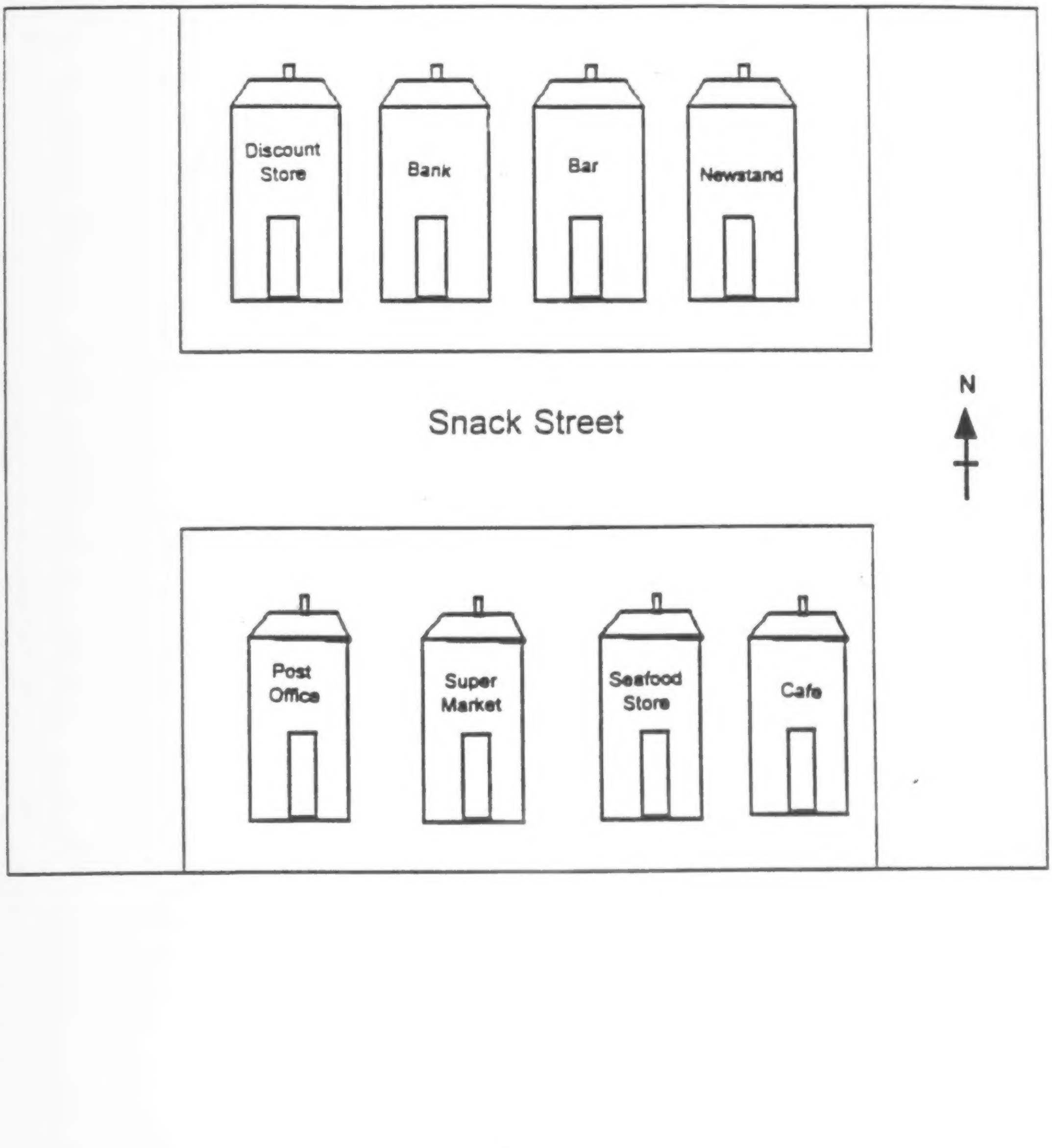
5. Then determine what information you need to get.

6. You and your partner should then ask and answer each other's questions until you both have all the information you need.

Activity: 11 - Getting Information Orally

Exercise 1 - Snack Street

1. Fill in the correct name for each of the buildings on Snack Street below.
2. Remember the techniques for asking questions.
3. Use your reasoning and common sense to name the buildings.


Discount Store
Bank
Bar
Newstand
Snack Street
N
Post Office
Super Market
Seafood Store
Cafe

FOODS

		WORK ORDER NO	
		47080	

EQUIP DESCRIPTION | EQUIP AVAILABLE | CRAFT

WORK REQUESTED:

DATE	REQUEST BY APPROVED BY	COMPLETION SIGN OFF		
		DATE	CRAFT PERSON	SUPERVISOR

CLASS WK | WORK ORDER TITLE

NUMBER	[illegible]	[illegible]	[illegible]	SUPV ASSIGNED	SHIFT	ACTION CODE	COMPONENT SUB	SUB

MOORE® SPEEDISET® MCP® · PATENTED 226

NABISCO
FOODS
GROUP

		WORK ORDER NO	
		47079	

EQUIP DESCRIPTION | EQUIP AVAILABLE | CRAFT

WORK REQUESTED:

DATE	REQUEST BY APPROVED BY	COMPLETION SIGN OFF		
		DATE	CRAFT PERSON	SUPERVISOR

CLASS WK | WORK ORDER TITLE

NUMBER	[illegible]	[illegible]	[illegible]	SUPV ASSIGNED	SHIFT	ACTION CODE	COMPONENT SUB	SUB

MOORE® SPEEDISET® MCP® · PATENTED 226

NABISCO
FOODS
GROUP

DEPARTMENT	COST CENTER	WORK ORDER NO	EQUIPMENT
		47078	

EQUIP DESCRIPTION | EQUIP AVAILABLE | CRAFT

WORK REQUESTED:

DATE	REQUEST BY APPROVED BY	COMPLETION SIGN OFF		
		DATE	CRAFT PERSON	SUPERVISOR

CLASS WK | WORK ORDER TITLE

NUMBER	[illegible]	[illegible]	[illegible]	SUPV ASSIGNED	SHIFT	ACTION CODE	COMPONENT SUB	SUB

Activity: 11 - Getting Information Orally

Exercise 2 - Work orders

1. On the opposite page are blank work orders.
2. You and your partner will be given different completed work orders.
3. Use the information that your partner has on his completed orders to fill in the heavily outlined areas on the blank work orders.
4. Ask and answer questions with your partner to get the information you nee

Activity: 12 - Giving and Getting Information Via Telephone

Objective(s): This activity will enable participants

1. To practice asking for and receiving information on the telephone.

Materials Required:

1. Telephone
2. Telephone books

You need to know:

About Listening and Speaking to Others

1. Your attitude and your ability to relate to other people (in person and over the telephone) are shown in the way you speak and in the attention you give when you listen.
2. Attitude and ability to relate to others make up about 85% of job success.
3. Prepare to use the telephone by deciding:
    a. How you will introduce yourself.
    When answering your work phone, say the name of your department and then give your name. When making a call, greet, give your name and department and ask for the person you need.
    b. Who you need to speak with.
    c. Why you are calling
    d. What background information you need to give.
    e. What questions you need to have answered.

Activity: 12 - Giving and Getting Information Via Telephone (continued)

Directions:

1. Fill in the charts with the information you gather as you make the following phone calls.
2. You may complete this activity at home as needed.
3. To gain practice, you must make each call yourself.

CALLS for Chart A

1. Call at least three suppliers of building materials to find the lowest prices for 2" x 4" studs in eight foot lengths.
2. Choose a city you would like to visit. You must be there by 9:00 p.m. on Friday. What will be the best way to get there - plane, train or bus?

CALLS for Chart B

3. You have to send a 20 pound package to Los Angeles, California, for delivery no later than 12 noon on next Tuesday. The Zip Code for the delivery is 90210. You need to send the package the cheapest way possible. Practice your telephone skills and get the information you need to make a decision.

Activity: 12 - Chart A

	Supplier 1	Supplier 2	Supplier 3	Airline	Amtrak	Bus
Step 1. Greeting- "Hello. This is __________."						
Step 2. "With whom am I speaking?"						
Step 3. "I'd like to get some information about __________." OR						
Step 4. "I'm working on a project for a class and I need __________."						
Step 5. Notes (Answers to your questions)						

Activity: 12 - Chart B

	Post Office	UPS	Federal Express	Other	Other
Step 1. Greeting- "Hello. This is ____."					
Step 2. "With whom am I speaking?"					
Step 3. "I'd like to get some information about ____." OR					
Step 4. "I'm working on a new project for a class and I need ____."					
Step 5. Notes (Answers to your questions)					

Total Group
Listening

Activity: 13 - Communicating Within a WorkGroup

Objective(s): This activity will enable the participant
1. To develop an awareness of the concept of workplace culture.
2. To identify the workplace culture at an organization.

Materials Required:
None

You need to know:

About Workplace Cultures

Every workplace is different in that every workplace has its own way of doing things; it's own culture. Listening actively will help you understand the culture of your workplace and your co-workers.

To understand the culture of your workplace, you have to learn four things about it:

1. The goals of the particular workplace. What are you expected to do?
2. The values of your workplace. What are the most important priorities here? What are the standards to which work has to be done or behavior has to be focused?
3. The customs of your workplace. What are the rules or procedures that are followed here?
4. The networks in your workplace. How does information flow here? Who talks to whom?

Directions:

1. Use the chart on the opposite page to organize your thoughts and notes from our discussion.

Activity: 13 - Communicating Within A WorkGroup

	Workplace #1	Workplace #2	Workplace #3
Goals			
Values			
Customs			
Networks			

Total Group
Listening

Activity: 14 - Communicating With Co-Workers

Objective(s): This activity will enable participants
1. To practice techniques for communicating effectively with co-workers.

Materials Required:
None

You need to know:

About Listening and Speaking to Co-Workers

Please DO	Please DON'T
1. Learn the workplace culture-the written (if any) and unwritten rules of co-worker communication.	Ignore the acceptable ways of communicating in your workplace.
2. Maintain an upbeat, "can do" attitude.	Be influenced by negative shop talk.
3. Learn the workplace jargon or special language.	Hesitate to ask questions when you need information.
4. Be mindful of your non-verbal language and behavior.	Infringe on other's personal space.
5. Remember that the tone of your voice sends more of a message than the actual words say.	Forget about all the non-verbal messages you send.
6. As much as possible, choose a good time to discuss a problem.	Try to discuss problems when others are rushed, distracted or upset.
7. Describe the problem carefully, avoiding personal criticism.	Let discussions of workplace problems become attacks on anyone's compentence.
8. In general, concentrate on the problems themselves; not on blaming.	Be distracted by the way problems are stated by your co-workers.

Activity: 14 - Communicating With Co-Workers (continued)

Please DO	Please DON'T
9. Limit the amount of personal information you share at the workplace.	Allow your personal life to interfere with your workplace responsibilities.
10. Use the active listening techniques with your co-workers giving supportive feedback when and where possible.	Let your emotions get out of control.

Directions:

1. Separate into occupational groups of no more than four people.

2. Each group member should share their perspective of a workplace communication with a co-worker (no names, please) that could have been improved if they or the co-worker had used more effective communication techniques.

3. Within your small groups, decide on several of the situations to discuss with the total group. Limit your discussions to situations about:
   a. telling co-workers about workplace needs or problems or
   b. telling co-workers on the next shift about the current status of an assignment station, piece of equipment, etc.

4. Add to your list of Please Do and Please Don't as the total group discussion unfolds.

Activity: 15 - Communicating With Supervisors

Objective(s): This activity will enable participants

1. To develop an understanding of an employee's roles and responsibilities in employee/supervisor communications.

Materials Required:
Pen or Pencil

You need to know:

About Your Responsibilities as an Employee

1. One of your most important responsibilities is to let your supervisor know about the work that you're doing.

2. Make every effort to learn what your supervisor expects you to tell him and how and when you should tell him. Learn what information is critical (requiring immediate notification of your supervisor) and what information is not as important. Generally, your supervisor wants to know about any work situation that has an impact on how he does his job.

3. Never feel that you shouldn't ask for information or any assistance that's needed to do your job. If you don't know how to do a job task, let your supervisor know.

Activity: 15 - Communicating With Supervisors (continued)

You need to know:

About Communicating With Your Supervisor

Remember To:	Try Not To:
Follow the standard operating procedure when communicating with your supervisor Understand as much about a situation as you can before talking to your supervisor Focus on the facts that you're giving to your supervisor Listen actively to your supervisor. Respond to him in accordance with what he asked; not what you think he said. Listen actively so as not to become confrontational or defensive or apologetic because of a misinterpretation of what was said.	Go against company policy or workplace culture in talking with your supervisor. Give inaccurate or insufficient information to your supervisor. Focus on your supervisor's personality or the negative influences of your co-workers. Don't blame other people for problems. Show negative behavior that will only work against you.

Directions:

1. Analyze communication situations you've had with your supervisor over the past few weeks. Think about situations in which you were given information or directions by your supervisor. Also, think about situations where you had t give your supervisor information or tell him about a problem.
2. Use the chart on the opposite page to organize your thoughts as we prepare to discuss some of these supervisory communication situations.

Total Group
Listening

Activity: 15 - Communicating With Supervisors

	Equipment	Materials	Procedure or Production Process	Labor/Scheduling
What (is the situation) or What (happened)				
When				
Where				
Why				
How				

Activity: 16 - Group Behavior

Objective(s): This activity will enable participants
1. To practice identifying positive and negative group behavior.

Materials Required:
1. Teacher dictated group communication materials.

You need to know:

About Group Behavior

Just as each person has a special personality, each group of people develops a personality also. The group's personality is influenced by the roles each member takes on. Group members tend to take on roles that are an extension of their own personality - being a leader or a joker; being a quiet observer or an agitator and so forth.

The important thing to understand is that the behavior of each group member will affect the group's ability to achieve the goal that should be common to everyone.

Behavior that Helps a Group

1. opening up discussions
2. contributing ideas
3. explaining to new members
4. asking questions
5. answering questions
6. asking for opinions
7. offering opinions
8. taking notes
9. listening to others
10. ____________________

Behavior that Hurts a Group

1. dominating discussions
2. discouraging ideas
3. playing
4. blocking development of ideas
5. "lobbying" for a personal or special interest
6. trying to get undue recognition or attention
7. ____________________
8. ____________________

Total Group
Listening

Activity: 16 - Group Behavior

Directions:

1. Listen carefully as comments people have made in group discussions are read
2. We will discuss which comments are positive behaviors and which are negative behaviors.
3. Refer to the lists above and add to them if you'd like.

Facilitator:

Read these statements one by one and allow the participants time to decide on the kind of group behavior demonstrated by each comment.

1. You have the wrong idea! Listen, let me straighten you out about a few things.
2. Hey, I was talking! I haven't made my point!
3. With all due respect to what you said, I see the problem from another perspective.
4. That idea sucks! It'll never work.
5. Let's give some other people a chance to speak before we reach a decision.
6. That's enough from you. Why don't you sit down, shut up, and give someone else a chance to talk.
7. We've always done it this way.
8. It'll never fly.
9. Yes, but....We've tried that before.....If it ain't broke, don't fix it.
10. Don't rock the boat.

Activity: 17 - Group Dynamics

Objective(s): This activity will enable participants
1. To develop an awareness of the stages of group dynamics.

Materials Required:
None

You need to know:

About Group Dynamics
Group dynamics refers to the collective pattern of behavior that unfolds as any group of people begin working together towards a common goal. There are several predictable stages of group dynamics and they are universal.

1. At first, a group leader seems to emerge from within the group and most members seem content to follow the leader while they "sort out" other group members and the job the group has to accomplish.

2. Next, and without most group members even realizing it, the members arrange themselves according to their roles, their influence within the group and their expertise.

3. In the next phase,group members become more related and develop a sense of belonging to the group.

4. The last stage of group dynamics begins when members actually begin working and communicating freely with each other in accomplishing the common goal of the group.

Directions:

1. The remaining activities in this module will require communicating within a group.

2. In addition to practicing and improving your listening, speaking, and group participation skills, observe the dynamics of the various groups.

Total Group
Listening
PINK - MAXIMUM LEVEL

Activity: 18 - Group Decision Making

Objective(s): This activity will enable participants
1. To understand three of the ways a group reaches a decision.
2. To practice making decisions within a group.

Materials Required:
1. Paper
2. Pen or pencil

You need to know:

About Group Decision Making
Groups of people have three basic ways of reaching decisions.

1. Dictatorship. A single group member takes over and makes the decisions for the entire group.

2. Majority Rule. Each group member votes on the decision to be made and the majority wins.

3. Consensus. Each group member decides on the one decision or solution that is acceptable enough so that the entire group is able to support or live with the decision. This method takes time, communicaiton, open-mindedness, creative thinking and total participation. It is the most deisrable way to reach a group decision because everyone wins.

Activity: 18 - Group Decision Making (continued)

DINING ROOM STAFF - 3RD Shift

Before leaving each night, you must:

-vacuum carpeting and wet clean tile foyer

-discard flower centerpieces as necessary/refill containers

-change tablecloths

-refill salt and pepper shakers and return them to the tables

-return chairs to tables

-set tables with napkins, silverware, glasses, and coffee cups inverted

-change menus

-add daily special to menus

Activity: 18 - Group Decision Making (continued)

Directions:

1. Separate into groups of five members.
2. Pretend that four of the group members work the evening shift in the restaurant of the best resort hotel in the area.
3. The fifth group member will act as an observer of the group.
4. Go over the notice on the opposite page that was on the bulletin board at the restaurant.
5. Each of you should number the items listed on the notice in the order you think they should be done.
6. Then, work together as a group to reach a decision about the most efficient order for the duties.
7. Be ready to express and defend your opinions but practice good group participation skills.

Activity: 19 - Demonstration Production Line

Objective(s): This activity will enable participants
1. To demonstrate an understanding of group process.
2. To practice effective communication within a group.
3. To practice group decision making skills.

Materials Required:
1. Demonstration Production Line Situation Materials
2. Pen or pencil

You need to know:

Techniques for Being a Successful Group Participant

Understand the Group's Members

Upon joining a group, learn the names of the other group members.
Learn all you can about each person's abilities and attitudes.
Look at group members who are talking. Scan others in the group for non-verbal signs of interest or disinterest.
Decide who the group's leaders are.

Understand How the Group Makes Decisions

Identify what the groups standards are. What does the group consider to be acceptable ways to resolve conflict, etc.?
Determine what the groups goals are and what the plans are for reaching the goal.

Use Effective Communication Skills

Always use positive behaviors (verbal and non-verbal).
Avoid negative comments and excessive talking.
Use active listening techniques when appropriate.

Total Group
Listening

Activity: 19 - Demonstration Production Line (continued)

Directions:

The Situation

Nabisco® has been invited to participate in an upcoming World's Fair. It has been decided that the company will have a demonstration production line that wil actually be a mini bakery for only one product. The public will be able to view the production process from start to finish and they will then be able to purchase the cookies that they have just seen being made.

The facility for the demonstration line does not yet exist and can be built to meet the mini bakery's needs. A special rail line has been built to the site of the Fair and an excellent highway system is in place also.

The Challenge

The REACH participants have been asked to contribute (based on their job knowledge) to the planning of the demonstration production line from start to finish.

You need to consider:

1. The need to maintain and even build upon the excellent public relations the company enjoys.
2. The need to create a totally functioning yet scaled down production line with a minimum investment.
3. The need to produce a consistently high quality product, seven days a week from 10:00 a.m. to 10:00 p.m. (the hours of the Fair).
4. The need to produce and package the product for an estimated 25,000 fair goers daily.

Part A

1. Separate into job groups (mixers, utility, etc.)

2. As a job group, envision what your department would be like in the above situation. Make the following decisions:

    a. the single product you think should be produced. What factors influenced your decision?

    b. what the basic requirements would be for your department to "set up" its duties. Which machinery and/or equipment would be needed?

    c. what job positions would be needed and how many people should be scheduled over 12 hours to fill those positions?

    d. what policies and procedures should your department put in place to contain costs?

    e. what policies and procedures should be put in place to facilitate being on public display? (Uniforms, communication methods, sanitation procedures, etc.)

    f. what recommendations would you make to the designer of the facility to ensure that your department's needs for space, safety, noise control, etc., are met.

Part B

1. Now that each job group has reached a decision about each department's needs, as a total group (all occupations together) discuss the same factors and come to a total group decision on each.

2. This is only an exercise. There are no right or wrong answers. This is an opportunity to put into practice all the communication skills you've learned to date.

Problem Solving

To the Facilitator:

The curriculum is color coded to indicate levels of difficulty. Yellow represents Minimum Level, blue represents Moderate Level, and Pink represents Maximum Level.

These levels correlate to the benchmarks established by employees and the results of the assessment process validated for selected jobs at the Nabisco Richmond Facility.

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Content Outline

1. The Problem Solving Mindset

2. A Problem Solving Process
    a. Identify and clarify the problem
    b. Analyze the problem
    c. Develop possible solutions
    d. Decide on and implement a solution
    e. Evaluate the solution
    f. Implement alternative solutions as needed
    g. Recycle the entire process as needed

Minimum Level Problem Solving

3. Solving Problems of Relationships Between Two Things
    a. If....then....
    b. Cause to effect
    c. Reason to result
    d. Parts of a whole
    e. Class and members
    f. General to specific
    g. Occupational problems

Moderate Level Problem Solving

4. Solving Problems with a Limited Number of Options
    a. Deductive Reasoning
    b. Vertical Thinking
    c. Flow Charting
    d. Applying the problem solving process to occupational problems

Maximum Level Problem Solving

5. Solving Problems with an Unlimited Number of Options
    a. Understanding General Rules and Principles
    b. Flow Charting
    c. Applying the problem solving process to occupational problems

YELLOW

Activity 1 - Problem Solving Mindset

Objective(s):
1. To establish a foundation and mindset for the module on solving problems.

Materials Required:
1. Two desks or other large objects placed at a 90 degree angle to each other so as to create an obstacle at the entrance to the REACH building.
2. "Do not disturb" sign

Directions:

1. Placing an obstacle with a Do not disturb sign on it at the entrance to the REACH building will create a common problem for all participants.

Activity 2 - Mind Mapping

Objective(s):
1. To introduce participants to the concept of mind mapping.

Materials Required:
1. Mind map transparency and handout
2. Pen or pencil

You need to know:

1. A mind map is a way of organizing thoughts.
2. Organizing thoughts with a mind map can help us to think through ideas and to begin to solve problems.
3. A mind map starts with a problem or central idea that is expressed in a few simple words.
4. These words become the center of the map and all other ideas will come from and relate to the center of the map.
5. Ideas about the problem or central idea are written down, enclosed in a "balloon" and connected to the core of the map.
6. When completed, a mind map will give you a picture of the problem and possible ways to think about, approach or begin to solve the problem.

Directions:

1. As a group we will develop a mind map based on the problem situation of having an obstacle in the door of the REACH building.
2. Use your handout to create your mind map.

MIND MAP

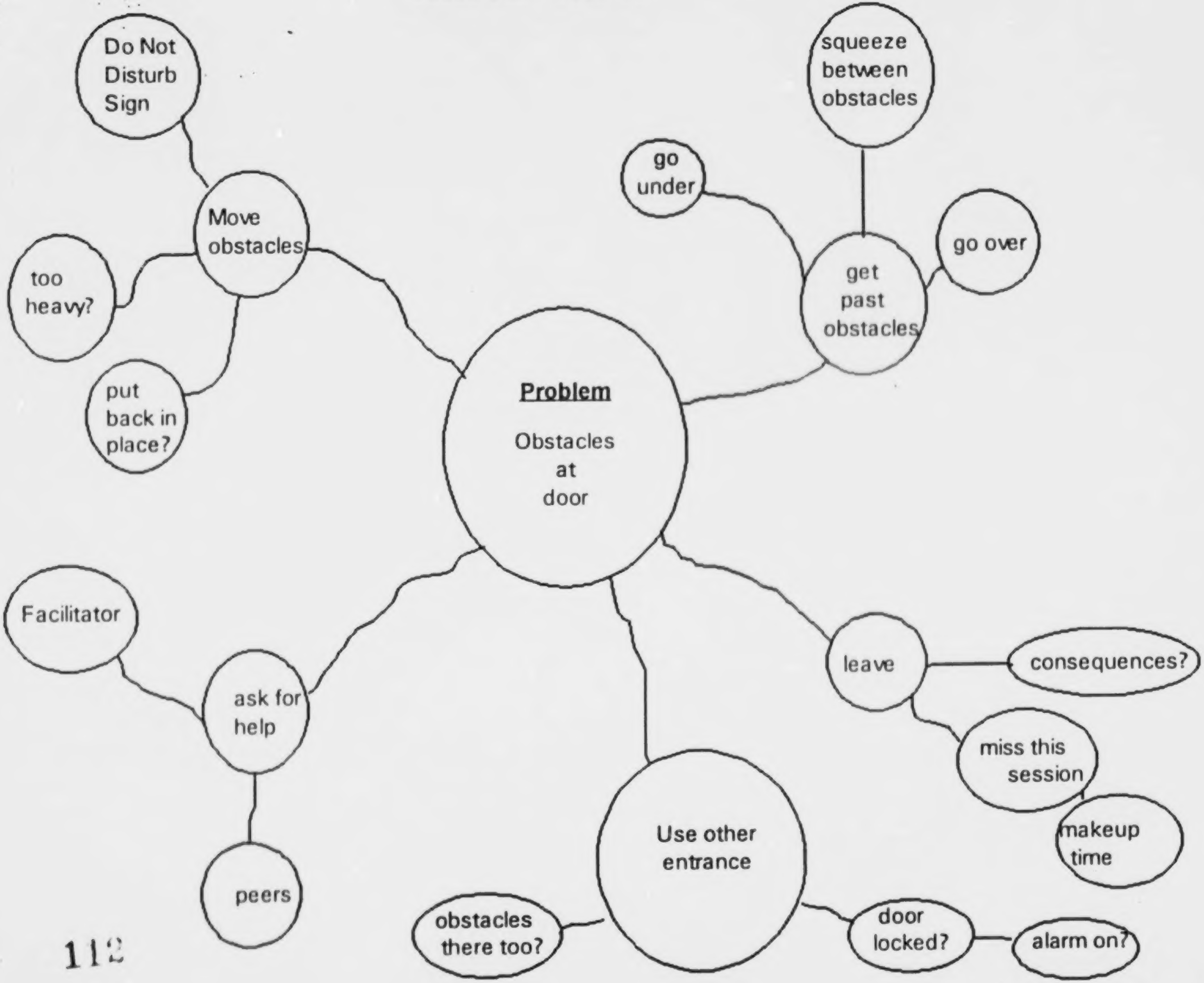
Problem
Obstacles at the door

Activity 2 - Handout

MIND MAP

Activity 2 - Handout B

MIND MAP



Problem
Obstacles at door

- Move obstacles
  - Do Not Disturb Sign
  - too heavy?
  - put back in place?
- get past obstacles
  - go under
  - squeeze between obstacles
  - go over
- leave
  - consequences?
  - miss this session
    - makeup time
- Use other entrance
  - obstacles there too?
  - door locked?
    - alarm on?
- ask for help
  - Facilitator
  - peers

Activity 3 - What Path Does Your Mind Take?

Objective(s):
1. To have participants analyze their individual approach to solving problems.

2. To have participants begin to explore the different avenues other's minds take when confronted with a problem.

Materials Required:
1. Mind Map handout
2. Pen or pencil

Directions:

1. Use the handout to organize your thoughts about how you would solve one of the work related problems that will be read to you.

2. Choose a problem that you have some knowledge about or have had to solve before.

3. Think carefully about the possibilities involved in solving the problem.

4. Develop a mind map of the approach you would take in solving the problem.

Activity 3 - What Path Does Your Mind Take? (continued)

Workplace Problems

1. Assembly/Mixer
   - Temperature of chocolate chips is higher than 55 degrees.

2. Baker/Machine Captain
   - There is a problem with the way the dough is machining - bubbles or too much lap, etc.

3. Machine Operator/Packing Tech
   - Bag weights are outside of tolerance levels.

4. Sanitor/Utility
   - Phostoxin has to be transported to outside containers labeled for each day.

5. Mechanic/Electrician
   - Lockout procedures have to be used to replace mechanical or electrical equipment.

MIND MAP

Activity 3

Activity 4 - Common Elements or Problems

Objective(s):
1. To have participants understand that all problem solving processes have certain elements in common.

2. To have participants demonstrate their understanding of those elements by separating their responses to Activity 3 into those elements.

Materials Required:
1. Completed mind map handout from Activity 3.
2. Pen or pencil

You need to know:

1. All problem solving processes have certain elements in common.

2. All problem solving processes require:
    a. Identifying the problem
    b. Generating ideas about the problem
    c. Trying out ideas about the problem
    d. Evaluating the resolution of the problem

Directions:

1. Using the completed handout from Activity 3, indicate which of the steps you take in solving that problem belong to which of the elements listed above.

2. Write an a, b, c, or d by your problem solving steps to indicate the element.

BLUE

Activity 5 - Steps In Problem Solving - Identifying The Problem

Objective(s):
1. To introduce participants to the first step in the problem solving process used in the module.

Materials Required:
1. Pen or pencil

You need to know:

1. Problem Solving skills help us get from where a situation or a process or a product is to where it should be or where we want it to be.
2. The first step in solving problems is the "Hold It! Something's wrong" step. That means that we have to recognize or identify when something is not as it should be. We have to realize that a product or situation is not at its optimal or best level.
3. Recognizing when something's wrong requires knowing what's right! For instance, we have to know what a properly sealed bag of cookies looks like before we can recognize improperly sealed bags and say "Hold it!" We have to know what a given product is supposed to be like (look, taste, feel, smell, etc.) at the point in the production process where we handle the product before we can recognize when that product is not as it should be and say "Something's wrong".
4. The optimal conditions or standards for the process, product, or machines used in your particular job have already been determined for the most part.
5. These optimal conditions or standards are taught to you in formal classes or through on the job training. Also, much of what you learn comes from experience.
6. Your primary problem-solving task is to identify when what's going on is something other than what's supposed to be going on.

Hold It ! Something's Wrong!	Door Obstacle			

Activity 5 - Steps In Problem Solving - Identifying The Problem (continued)

Directions:

1. Discuss at what point you recognized that something was wrong as you were trying to enter the REACH building today.

2. Review in your mind some of the problem solving situations you faced on the job over the past several weeks. Choose one situation for discussion.

3. Be prepared to share with the group your knowledge of the accepted standard for the situation and at what point you recognized that what was going on was not in keeping with that standard.

4. Use the chart on the opposite page to organize your notes from our discussion.

5. Take your time and think carefully about the problem, the accepted standard (what was supposed to be going on) and the point at which you said "Hold it".

Activity 6 - Clarifying An Identified Problem

Objective(s):

1. To have participants practice a method for clarifying the elements of an identified problem.

Materials Required:

1. Pen or pencil

You need to know:

1. An important part of the "Hold it" step is as being sure of what the problem is as you can be in any given situation.

2. Clarify an identified problem by asking yourself....

   How critical is this problem?
   How much time, energy and materials can I give to this problem?
   What is the best condition that I can achieve with this problem?

3. Try to ask the who, what, when, where, how and why kind of questions about the problem as you clarify it in your mind.

   Who (should page the mechanic when one is needed?)
   What (should I do if the ovenband stops?)
   When (should I do a cream-up?)
   Where (should I check to see which bins need to be fumigated?)
   Why (did the belts shut down and the red light start flashing?)
   How (many doughs are in the proof room?)

Hold It ! Something's Wrong!	**Door obstacle**			
Current condition?				
Limitations				
Optimal condition for this situation or product?				
Something's wrong with this product or situation				
because				
because				
because				
because				

Activity 6 - Clarifying An Identified Problem (continued)

You need to know:

4. There are situations where it may be helpful to ask the same question several times to clarify exactly what the problem really is. For example...

Problem as first perceived
-I don't have enough money to pay my bills this month.

because - The last check I wrote was not accepted by the merchant.

because - The bank said there was not enough money in my account to cover the check.

because - My balance is lower than I thought it was.

because - I forgot to deposit my last paycheck!

Immediate solution
-Deposit paycheck.

Long term solution
- Sign up for automatic deposit of paycheck.

Directions:

1. As a group we'll apply the clarification methods just discussed to the door obstacle problem.
2. Then you apply the clarification methods just discussed to your chosen problem. Is the problem any clearer?
3. Be prepared to discuss your chosen problem with the group.
4. Complete the handout on identifying and clarifying problems using the workplace problem you chose.

Activity 7 - Thinking Of Solutions To Problems

Objective(s):
1. To introduce participants to the second step in the problem solving process presented in the module.

Materials Required:
1. Pen or pencil

You need to know:

1. The second step in problem solving is the "Think" or "What can I do about it?" step. That means that we try to think of a way to solve the problem.

2. Some problems are limited in scope and may have only one solution. These are clear cut problems. As long as you know the rule or principle at the heart of the problem, you can solve the problem. For example,

   Problem - If the glue level in glue pot is low,
   Solution - transfer glue chips from barrel to glue pot.

3. Some problems are more complicated and may have more than one solution. Choosing between two options requires using your judgement and knowledge as you apply the rules.

   Problem - cookie stack height is beyond the control limits.
   Solution - make a decision to:
   a. accept the information
   b. notify the machine operator or baker by telephone
   c. other

What can . do about it?	Door Obstacle			

Activity 7 - Thinking Of Solutions To Problems (continued)

You need to know:

4. Still other problems are even more complex and may require trying several possible solutions before the problem can be corrected. For example,

Problem - The moisture percentage in the product is higher than the acceptable level.

Solution -
- a. Check the product weight.
- b. If the weight is not within the acceptable range make approved adjustments.
- c. If the weight is okay, adjust the heat in the oven by following approved procedures.
- d. Periodically check the oven profile chart and adjust according to the master oven chart. Document all adjustments.

Directions:

1. As a group, we will complete the door obstacle column of the handout on thinking about solutions to problems.

2. Then, you will analyze the workplace problem you've been considering and try to determine if it's simple (only one option), a little more complicated (several options), or complex (many options).

3. Think about how many choices you had when you were faced with the problem.

4. Complete the correct column on the handout on thinking about solutions to problems.

5. Be prepared to share your analysis with the group.

Activity 8 - Trying Out Solutions To Problems

Objective(s):

1. To introduce participants to the third step in the problem solving process presented in this module.

Materials Required:

1. Pen or pencil

You need to know:

1. The next step in solving problems is the "Let's see if this works" step. This step means trying out possible solutions to see which one works.

2. Just as company policy determines the standard by which we measure problems, company policy also determines what possibilities there are for solving problems.

3. Within the limits of company policy, choose solutions that demonstrate
   a. you've gathered as much information (time, materials, etc.) as necessary to make an informed choice.
   b. you're aware of the underlying rules or principles governing the operation of machines, the production process and the product itself.

4. Try the most likely solution to the problem.

Directions:

1. As a group, we will complete the door obstacle column on the chart on trying out solutions to problems.

2. Then, you will complete the appropriate column for the workplace problem you've been analyzing during this module.

Let's see .. this will work....	Door Obstacle			

Activity 9 - Evaluating The Solution To The Problem

Objective(s):

1. To introduce participants to the last step in the problem solving process presented in the module.

Materials Required:

1. Pen or pencil

You need to know:

1. The next step in solving problems is the "Is it fixed yet?" step. This means evaluating whether or not the problem has been fixed or solved.
2. This step could be the last in solving your problem or it could be the first step in taking a closer look at identifying the problem once more if what you tried did not work.
3. If what you tried did not return the process, machine or product to optimal conditions, go back to step one and repeat the problem solving process again.

Directions:

1. Again, as a group we will complete the door obstacle column on the appropriate handout.
2. Then, you will complete the appropriate column for evaluating your workplace problem.

Is it fixed yet?	Door Obstacle			

PINK

Activity 10 - Troubleshooting

Objective(s):
1. To have participants develop skills in troubleshooting problems.

Materials Required:
None

You need to know:

1. Troubleshooting is a special kind of problem solving. Troubleshooting methods are used when something goes wrong with mechanical or production equipment.
2. A basic process approach can be used to locate and correct mechanical types of problems.
3. When mechanical or production equipment fails to work properly and a production line doesn't move, the business is losing money. Its manufacturing expenses continue but the company is not producing items that can be sold.
4. Almost any machine or piece of equipment will fail at some time or another. This is when knowing how to troubleshoot (knowing which questions to ask and how to think about answers to those questions) will lead to solutions.

Activity 10 - Troubleshooting (continued)

A TROUBLESHOOTING PROCESS

a. State the problem clearly and simply just as you expressed the problem statement in your mind map.

b. Then, ask these questions about the machinery that is not working.
   (1) What happened, exactly?
   (2) Where, exactly, is the condition located?
   (3) How is this condition different from normal operation?
   (4) What does this condition represent or mean?

   Although this is the last question in the process, it can be used at each step in applying the troubleshooting process. This question will help you find the cause of an problem provided you have an understanding of the basic rules and principles on which a piece of machinery operates.

c. Think about these questions. Consider them in dealing with a troubleshooting situation of any kind.

Directions:

1. The facilitator is going to tell you about a problem that he/she needs to solve. You will be told only one or two facts about the problem at a time.

2. Use the troubleshooting questions you've just reviewed to help the facilitator solve the problem.

3. Later, you will develop a similar troubleshooting problem based on an experience you've had with a piece of equipment that you have some knowledge about.

Activity 12 - Problem Solving Review

Objective(s)
1. To have participants review and reinforce the problem solving process presented in this module.

Materials Required:
1. Mind map handout and list of problems

Directions:

1. Choose a problem from the list below and create a mind map of solutions to the problem.

2. Use the problem solving and troubleshooting process discussed in this module.

3. The facilitator will review the process with the group before you begin to work on your problem.

WORKPLACE PROBLEMS -

1. The moisture percentage in a product is higher than the acceptable level.

2. The flour is not flowing to the mixer

3. The dough temperature is too hot or too cold.

4. The spray oil machine is not putting enough oil on the Ritz® bottoms.

5. The Premium ®Mini-cartoner is stopping.

6. Cartons (Cartoner 4 and 7) are not opening.

7. Product color is too light.

8. Too much product drops into a bag. The bagger cuts off and the LCD panel reports a Cross Jaw Jam.

9. There is a high percentage of product breakage at the bundler.

Activity 13 - Practice Exercises

Objective(s): To have participants practice their analytical and problem solving skills.

Materials Required:
1. Pen or Pencil
2. Demonstration Production Line Situation Materials

Directions:

1. Apply the problem solving process you've learned to the following situation.

2. Think in terms of having a situation that needs to be organized rather than a problem that needs to be solved. That means, rather than analyzing a problem, analyze the situation and apply the same process for finding a solution.

The Situation

Nabisco® has been invited to participate in an upcoming World's Fair. It has been decided that the company will have a demonstration production line that will actually be a mini bakery for only one product. The public will be able to view the production process from start to finish and they will then be able to purchase cookies that they have just seen being made.

The mini bakery and the public areas of this facility will be open from 10:00 a.m. to 10:00 p.m., seven days a week for the 12 months that the Fair is expected to run.

Activity 13 - Practice Exercises (continued)

The Challenge

Staffing and scheduling employees for this new, although temporary, facility is a problem that REACH participants are being asked to help solve.

Your problem is to develop a work schedule for the World's Fair facility. Consider the following as you develop your schedule:

1. The hours of the facility are 10:00 a.m. to 10:00 p.m., seven days a week for 52 weeks.
2. Twenty-three employees in various jobs at the 9 Nabisco® bakeries are transferring temporarily to the city of the World's Fair to work on the demonstration production line. These employees have equal seniority status and have all been cross-trained especially to work in this facility.
3. Any additional workers need for the facility can be hired locally on a temporary basis just before the facility opens.
4. There will be only one production line in this facility.

Set up a schedule that will show:

- what the shifts will be for the World's Fair facility. Allow for a 40 hour week for Nabisco® employees.
- how many people in which jobs will work on those shifts.
- where part time and/or temporary workers may have to fill in.

YELLOW

REACH Program
Understanding How to Use Your Calculator Activities

Cluster:______

Activity 1 - Understanding how to use a Calculator

Objective (s): This activity will enable participants

1. To become familiar with the keys of a calculator
2. To become familiar with the functions of a calculator
3. To practice entering numbers in a calculator

Materials Used: calculator

You Need to Know:

The second college edition of *The American Heritage Dictionary* defines a calculator as a keyboard machine for the automatic performance of mathematical operations. In today's work environment users simply refer to the calculator as their best friend because they are fast and accurate. However, workers understand that the answers a calculator provides are as accurate as the person using the calculator. That's why it is important to know how your calculator works.

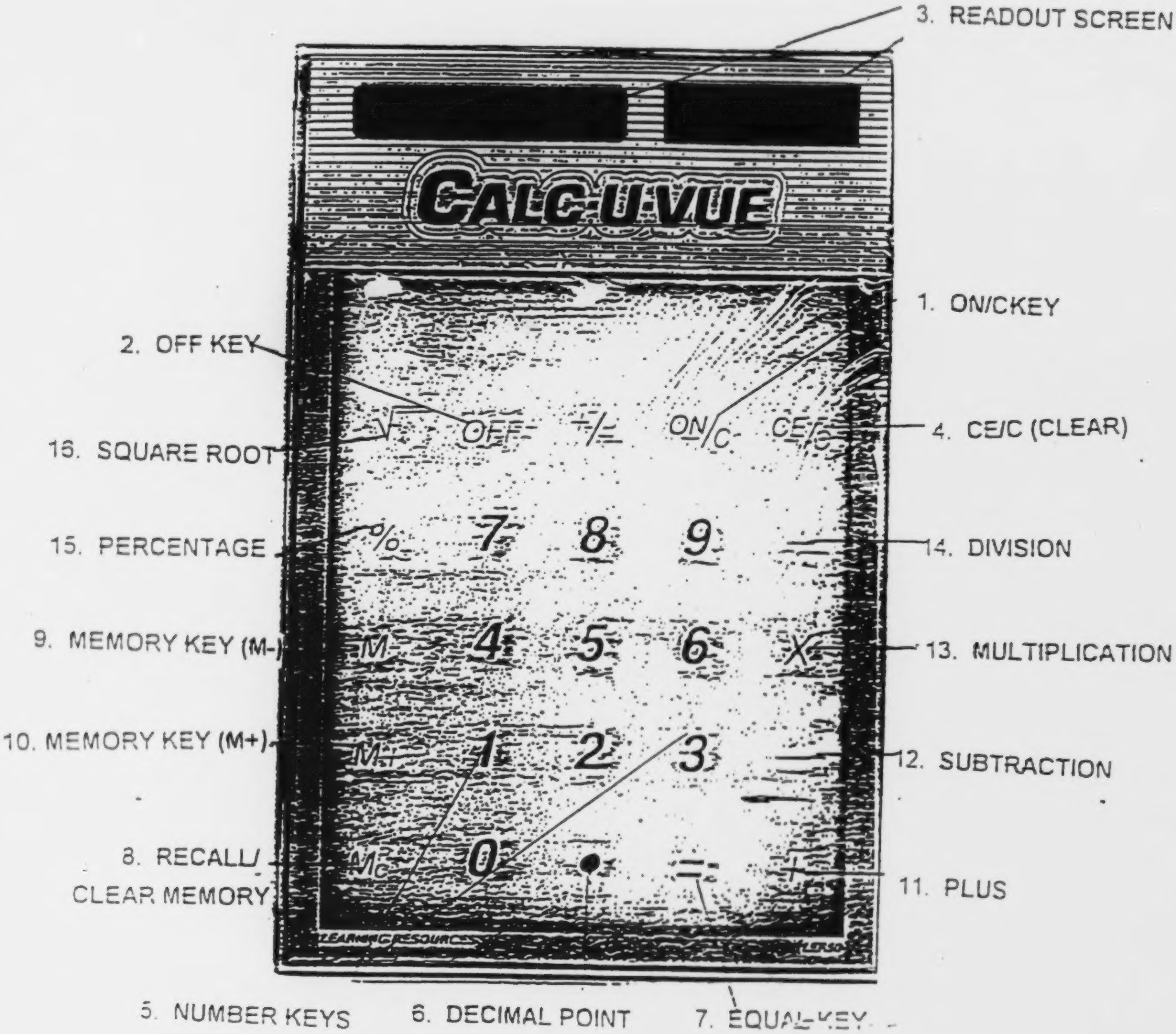
All calculators perform the four basic mathematical functions of addition, subtraction, multiplication, and division. There are other calculators that perform more advance math functions such as square roots, plotting, advanced calculus, and many other scientific calculations. Texas Instruments Inc. is one of many companies that manufacture scientific calculations. In this course, you will be using a basic calculator. It is a calculator that performs the basic four mathematical functions, percentages, and square roots.

Calculators operate by solar-power or battery. Solar-powered calculators have a row of solar cells that change light into electricity. Battery-powered calculators contain a battery, usually in the back of the calcuator. Now, let's get familiar with the calculator. Read through the calculator diagram on the following page.

CALCULATOR DIAGRAM

Directions

Study your calculator. Notice what each key does.


3. READOUT SCREEN
CALC-U-VUE
1. ON/CKEY
2. OFF KEY
16. SQUARE ROOT
OFF
+/-
ON/C
CE/C
4. CE/C (CLEAR)
15. PERCENTAGE
%
7
8
9
14. DIVISION
9. MEMORY KEY (M-)
M-
4
5
6
×
13. MULTIPLICATION
10. MEMORY KEY (M+)
M+
1
2
3
12. SUBTRACTION
8. RECALL/
CLEAR MEMORY
MC
0
•
=
+
11. PLUS
LEARNING RESOURCES
5. NUMBER KEYS
6. DECIMAL POINT
7. EQUAL KEY

Keys

1. **ON/C KEY** - Use this key to turn your calculator on.

2. **OFF KEY** - Use this key to turn your calculator off.

3. **READOUT SCREEN** - Read the answers on this display screen.

4. **CE/C (CLEAR)** - Use this key to erase your entries.

5. **NUMBER KEYS** - Use these keys to enter the numbers.

6. **DECIMAL POINT** - Use this key to insert a decimal point.

7. **EQUAL KEY** - Use this key to get the answer.

8. **RECALL/CLEAR MEMORY (RM/CM) KEY** - Use this key to retain a number entry in the calculator's memory. Consider this sample problem: 100-10 = 90, press the RM/CM and the answer 90 is subtracted from the first entry 100. The answer is a negative 10. This key is helpful when you're working with a series of numbers.

9. **MEMORY KEY (M-)** - Use this key when working with a series of numbers and different functions. The calculator will hold an answer in memory. For example, 10-5=5, press M- key, the answer is 5, press (-) key, enter 2, press, M- key, the answer is 3. Notice the "M" appears on the readout screen to let you know the memory key is on.

10. **MEMORY KEY (M+)** - Use this key add a series of numbers. Consider this example, 10+5=5, press M+ key, the answer is 15, press (+) key, enter 5, press M+ key, the answer is 20.

Function Keys

11. **PLUS** - Use this key to add numbers.
12. **SUBTRACTION** - Use this key to subtract numbers.
13. **MULTIPLICATION** - Use this key to multiply numbers.
14. **DIVISION** - Use this key to divide numbers.
15. **PERCENTAGE +/-** - Use this key to calculate percentages.
16. **SQUARE ROOT** - Use this key to calculate the square root of numbers.

Practice

Follow these steps to practice entering whole numbers with your calculator.

Step 1: Turn on your calculator by pressing the key with **ON/C KEY**.
Step 2: Enter a number from the list below on your calculator.
Step 3: Erase the number using the CE/C key.
Step 4: Repeat steps 2-3 until you've entered and erased all the numbers for this exercise.
Step 5: Turn off your calculator.
Note: Most calculators do not display a comma. If the number displays as 1960, simply count three number places from the left. In this case 0, 6, 9, the comma would be inserted after the number 1 (1,960). Any number over 999 should be written with a comma.

A. **Practice entering numbers.**

1. 349
2. 974
3. 9,175
4. 8, 387
5. 27,285
6. 342,829
7. 88,642
8. 347,829
9. 755,691
10. 2,596,327
11. 9,442,611
12. 5,678

B. **Entering numbers with decimal points.**

Step 1: Turn on your calculator by pressing the key with **ON/C KEY**. Find the decimal key (.) on your calculator.
Step 2: Enter the number 12
Step 3: Press the decimal key (.)
Step 4: Then enter the number 2
Step 5: Press CE/C key to erase the number 12.2

Practice Exercise Continued...

Step 6: Repeat steps 2-4 until you've entered and erased all the numbers for this exercise.
Step 7: Turn off your calculator.

1. 56.78
2. 99.28
3. 110.8
4. 555.75
5. 100.78
6. 12.58
7. 600.78
8. 900.00
9. 88.8
10. 6.67

Activity 2 - Using and Understanding the Addition Function

Objectives (s): This activity will enable participants

1. To become familiar with the addition function of a calculator
2. To practice the addition function on a calculator

Materials Used: scrap paper, calculator

Directions

A calculator makes adding numbers easy. Follow these steps when adding numbers on your calculator.

Step 1: Turn on your calculator. Look for the plus (+) sign. Then look for the equal (=) sign. You will use both of these keys when you are adding numbers.
Step 2: Enter the numbers 1, 0, 0
Step 3: Press the plus sign (+)
Step 4: Enter 2, 0, 0
Step 5: Press the equal key (=)
Step 6: Read the answer in the readout screen area. The answer is 300.

Practice

Use your calculator to find the sum of the numbers. Write your answers in the space provided.

A. Find the sum.

1. 3,156, 7,125 ________
2. 7,206, 4,926, 3,331 ________
3. 8,501, 6,742 ________
4. 5,123, 9,600, 7,689 ________
5. 3,900, 6,174 ________
6. 378, 4,214 ________

B. Find the sum.

1. 16.2, 12.06________
2. 123.0, 451.2 ________
3. 5.2, 6.8 ________
4. 234.2, 123.5 ________
5. 6.1, 6.4 ________
6. 12.1, 45.2 ________

Activity 3 - Using and Understanding the Subtraction Function

Objectives (s): This activity will enable participants

1. To become familiar with the addition function of a calculator
2. To practice the subtraction function on a calculator

Directions

A calculator makes subtracting large numbers easier. Follow the steps to subtract the numbers.

Step 1: Turn on your calculator. Find the minus (-) sign. The find the equal sign (=).
Step 2: Enter the numbers 6, 0, 0. When subtracting remember to enter the larger number first.
Step 3: Press the minus sign (-)
Step 4: Enter the numbers 3, 0, 0
Step 5: Press the equal (=) key. The answer is 300.

Practice

Use your calculator to find the difference between the numbers. Write your answers in the space provided.

A. Find the difference.

1. 7,500, 5,916 ______
2. 9,306, 8,200 ______
3. 3,472, 1,568 ______
4. 99, 48 ______
5. 5,280, 1,000 ______
6. 18,480, 15,840 ______
7. 5, 820, 1,760______
8. 2,786, 1,308 ______
9. 2,815, 1,940 ______
10. 2,182, 655______
11. 1,075, 758 ______
12. 2,631, 131 ______

B. Find the difference.

1. 31. 2, 12.6______
2. 119.1, 67.0 ______
3. 303.1. 240.2 ______
4. 45.3, 23.2 ______
5. 20.1, 18.2 ______
6. 25.9, 12.8 ______

Activity 4 - Using and Understanding the Multiplication Function

Objectives (s): This activity will enable participants

1. To become familiar with the multiplication function of a calculator
2. To practice the multiplication function on a calculator

Directions

A calculator can also make multiplication easier. Read the example below. Follow the steps to understand how to use your calculator to multiply large numbers.

Step 1: Turn on your calculator. Find the multiplication sign (x). Find the equal sign (=).
Step 2: Enter the numbers 8, 5, 6, 4
Step 3: Press the x sign
Step 4: Enter the numbers 7, 2, 1, 3
Step 5: Press the equal sign (=). Read the answer on the readout screen. The answer is 61,772,132 (66 million, 772 thousand, 132).

Practice

Use the calculator to find the product of each group of numbers. The answer to a multiplication problem is called the product. Write the product in the space provided.

A. Multiply the numbers.
1. 6, 6 ______ 2. 27, 4 ______ 3. 12, 12 ______4. 50, 6 ______
5. 20, 20 ______6. 200, 7 ______7. 500, 8 ______8. 1000, 8 _____

B. Multiply the numbers.
1. 5,306, 8,317 ______2. 648, 4,269 ______3. 510, 888 ______

4. 92,000, 45 ______ 5. 80,000, 25 ______6. 357, 968 ______

Activity 5 - Using and Understanding the Division Function

Objectives (s): This activity will enable participants

1. To become familiar with the division function of a calculator
2. To practice the division function on a calculator

Directions

You can also solve division problems using your calculator. Follow the sample problem to understand the process. Find the division (÷) sign on your calculator.

Step 1: Turn on your calculator.
Step 2: Enter the numbers 2,0,0
Step 3: Press the division sign (÷).
Step 4: Enter the number 1, 0
Step 4: Press the equal sign (=).
Step 5: Read the answer on the display screen. The answer is 20.

Practice

A. Divide the numbers.

1. 500, 20 ______ 2. 600, 30 ______ 3. 20, 5 ______

4. 1000, 6 ______ 5. 790, 5 ______ 6. 180, 4 _____

B. Divide the numbers.

1. 10,000, 90______ 2. 124,780 ,20______
3. 45,000, 60______ 4. 985, 3 _______
5. 50,650 ,10 ______ 6. 540, 25 ______

Applied Math

To the Facilitator:

The curriculum is color coded to indicate levels of difficulty. Yellow represents Minimum Level, blue represents Moderate Level, and Pink represents Maximum Level.

These levels correlate to the benchmarks established by employees and the results of the assessment process validated for selected jobs at the Nabisco Richmond Facility.

80% mastery is recommended per activity before progressing to next activity.

Minimum Level Applied Math

1. Adding and Subtracting
   a. Calculating the Range Between Two Numbers
   b. Adding Ingredients
   c. Calculating Oil Usage
   d. Calculating Time on Time Cards
   e. Using a Calculator

Moderate Level Applied Math

2. Adding and Subtracting Decimals
   a. Dough Weights
   b. Product Weights

3. Multiplying and Dividing
   a. Sifter Tailings
   b. Calculating Breakage
   c. Determining Hourly Production Needs for Dough

4. Calculating Averages
   a. LayTimes - Time
   b. Bag Weights - Decimals

Maximum Level Applied Math

5. Calculating Oil Percentages

6. Calculating Average Dough Weight in Decimals

7. Calculating Cubic Footage
   a. Fogging
   b. Using Pesticides

Cluster
Applied Math
YELLOW

Activity 1 - Whole Numbers

Objective(s): This activity will enable participants to identify and write whole numbers.

Materials Required:
Pencil

You need to know:

1. Whole numbers are counting numbers and 0; they are numbers that are not fractions or decimals. They tell how many or how much.

2. A whole number represents a complete amount or group.

   EXAMPLES:

   Numbers: 0, 6, 13, 20, 50, 234

   Quantities: 142 machine screws, 12 spools, 47 outlets

   Measurements: 63 feet, 120 millimeters, $354

3. The Arabic number system is based on 10 digits:

   0 1 2 3 4 5 6 7 8 9

   Each of these symbols (0-9) is called a digit. These individual symbols (digits) may be combined to write any number.

Activity 1 - Whole Numbers (continued)

Directions: For each of the following numbers place a (✓) in the box if the number is a whole number.

1. ☐ 6
2. ☐ 14
3. ☐ 37
4. ☐ 365
5. ☐ 901
6. ☐ 2,225
7. ☐ 6,592
8. ☐ 8,831
9. ☐ 4,895
10. ☐ 33,485
11. ☐ .6
12. ☐ .005
13. ☐ .07
14. ☐ 2.5
15. ☐ .82
16. ☐ .231
17. ☐ .7304
18. ☐ 1491
19. ☐ 20.04
20. ☐ 7.83
21. ☐ 4
22. ☐ 15
23. ☐ 82
24. ☐ 359
25. ☐ 763
26. ☐ 2,227
27. ☐ 6,552
28. ☐ 8,231
29. ☐ 3,998
30. ☐ 50,001
31. ☐ .1
32. ☐ .5
33. ☐ .7
34. ☐ .25
35. ☐ .076
36. ☐ .226
37. ☐ 7.304
38. ☐ 14.91
39. ☐ 2.004
40. ☐ .783
41. ☐ 8
42. ☐ 18
43. ☐ 56
44. ☐ 321
45. ☐ 288
46. ☐ 2,221
47. ☐ 6,512
48. ☐ 8,631
49. ☐ 7,246
50. ☐ 29,092
51. ☐ .8
52. ☐ .05
53. ☐ 7
54. ☐ 25
55. ☐ .08
56. ☐ .217
57. ☐ 73.04
58. ☐ .1491
59. ☐ 200.4
60. ☐ .0783

Activity 1 - Whole Numbers (continued)

Directions: For each of the following numbers place a (✓) in the space if the number is a whole number.

__________ 1. 4,699

__________ 2. 96.677

__________ 3. 620

__________ 4. 2.053

__________ 5. .4001

__________ 6. 28

__________ 7. .1

__________ 8. 8,261.1

__________ 9. 1.25

__________ 10. 27,611.9

__________ 11. .07

__________ 12. .0001

__________ 13. .367

__________ 14. 3,842

__________ 15. 493,200

__________ 16. 926.

__________ 17. 6.790

__________ 18. 58,416

__________ 19. 6,815

__________ 20. 649,873

__________ 21. .072

__________ 22. .84

__________ 23. .7159

__________ 24. .638

__________ 25. .3901

__________ 26. 495.28

__________ 27. 6215.9

__________ 28. 518.7302

__________ 29. 429,631.058

__________ 30. 85,210.3697

Activity 1 - Whole Numbers (continued)

Directions: Write examples of whole numbers in the following blanks.

_____________ 1.

_____________ 2.

_____________ 3.

_____________ 4.

_____________ 5.

_____________ 6.

_____________ 7.

_____________ 8.

_____________ 9.

_____________ 10.

_____________ 11.

_____________ 12.

_____________ 13.

_____________ 14.

_____________ 15.

_____________ 16.

_____________ 17.

_____________ 18.

_____________ 19.

_____________ 20.

_____________ 21.

_____________ 22.

_____________ 23.

_____________ 24.

_____________ 25.

_____________ 26.

_____________ 27.

_____________ 28.

_____________ 29.

_____________ 30.

Activity 2 - Place Values and Whole Numbers

Objective(s): This activity will enable participants to identify the place values of whole numbers.

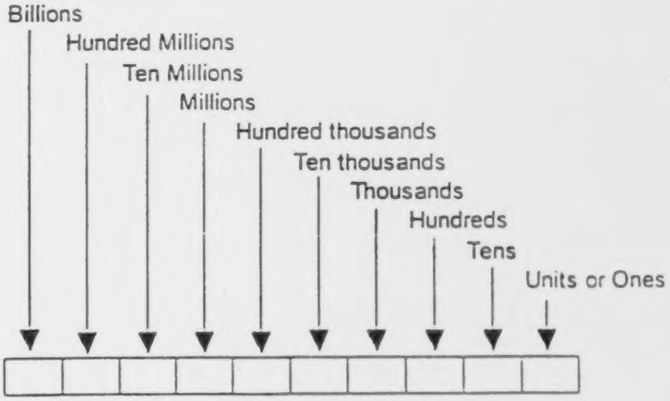
Materials Required:
Pencil

You need to know:

1. Each digit of a number from 0 through 9 has two values:
   A. Face value - what the numeral actually says
   B. Place value - the place (position) of the numeral tells it value

2. The first digit (column) in the extreme right position of a number is called the units digit or units column. The digit in the second position to the left is in the tens column; and the digit in the third location is in the hundreds column, etc. See the diagram below for additional examples of the place names of commonly used digits.

DIGIT PLACE NAMES (WHOLE NUMBERS)


Billions
Hundred Millions
Ten Millions
Millions
Hundred thousands
Ten thousands
Thousands
Hundreds
Tens
Units or Ones

Activity 2 - Place Values and Whole Numbers (continued)

You need to know:

3. Each digit can be assigned a different value depending on its place or position in the number. Example:

thousands	hundreds	tens	units *or* ones
8	7	6	5
5	6	7	8
7	8	5	6
6	5	8	7

Notice that the 8 in the first number is in the thousands place. That means it is worth 8 thousand. In the second number, the 8 is in the units or ones place. It is worth 8 ones or just plain 8. In the third number, the 8 is in the hundreds place, and it is worth 8 hundred. In the last number, the 8 is in the tens place. That means it is worth 8 tens or 80.

4. Whole numbers represent the sum of individual place values of numerals.

EXAMPLE: 217

$$\begin{array}{rl} 200 & \rightarrow \text{2 hundreds} \\ \div\ 10 & \rightarrow \text{1 ten} \\ \div\ 7 & \rightarrow \text{7 ones} \\ \hline 217 & \end{array}$$

The whole number 217 is a simple and shortened form of 200 ÷ 10 ÷ 7.

Directions:

On the following page, write the value of the underlined number in the blank.

Activity 2 - Place Values and Whole Numbers (continued)

1. In the number 283, how much is the 8 worth? ________
2. In the number 1,296, how much is the 1 worth? ________
3. In the number 926, how much is the 6 worth? ________
4. In the number 637, how much is the 6 worth? ________
5. In the number 240, how much is the 4 worth? ________
6. In the number 318, how much is the 8 worth? ________
7. In the number 1,873, how much is the 7 worth? ________
8. In the number 8,176, how much is the 8 worth? ________
9. In the number 561, how much is the 5 worth? ________
10. In the number 746,721, how much is the 4 worth? ________
11. In the number 678, how much is the 7 worth? ________
12. In the number 3,016, how much is the 3 worth? ________
13. In the number 235,619, how much is the 2 worth? ________
14. In the number 145,768, how much is the 5 worth? ________

15. The value of 9 in the number 3,739,681 is: ________
16. The value of 7 in the number 873,000 is: ________
17. The value of 6 in the number 6,284,925 is: ________
18. The value of 4 in the number 46,867 is: ________
19. The value of 8 in the number 1,863,745 is: ________
20. The value of 3 in the number 5,632 is: ________
21. The value of 7 in the number 3,754 is: ________
22. The value of 5 in the number 2,385 is: ________
23. The value of 3 in the number 329 is: ________
24. The value of 6 in the number 76 is: ________
25. The value of 4 in the number 64 is: ________

Activity 2 - Place Values and Whole Numbers (continued)

Directions: Fill in the blanks with the correct numbers.

(1) In the number 6,973.....
the value of 3 is _____ ones or _____.
the value of 7 is _____ tens or _____.
the value of 9 is _____ hundreds or _____.
the value of 6 is _____ thouands or _____.

(2) In the number 1,478.....
the value of 8 is _____ ones or _____.
the value of 7 is _____ tens or _____.
the value of 4 is _____ hundreds or _____.
the value of 1 is _____ thousand(s) or _____.

(3) In the number 11,243.....
the value of 3 is _____ ones or _____.
the value of 4 is _____ tens or _____.
the value of 2 is _____ hundreds or _____.
the value of 11 is _____ thousands or _____.

(4) In the number 48,505.....
the value of 5 is _____ ones or _____.
the value of 0 is _____ tens or _____.
the value of 5 is _____ hundreds or _____.
the value of 48 is _____ thousands or _____.

(5) In the number 6,054.....
the value of 4 is _____ ones or _____.
the value of 5 is _____ tens or _____.
the value of 0 is _____ hundreds or _____.
the value of 6 is _____ thousands or _____.

Activity 2 - Place Values and Whole Numbers (continued)

Directions: Fill in the blanks with the correct numbers.

(6) In the number 742.....
the value of 2 is _____ ones or _____.
the value of 4 is _____ tens or _____.
the value of 7 is _____ hundreds or _____.

(7) In the number 8,137.....
the value of 7 is _____ ones or _____.
the value of 3 is _____ tens or _____.
the value of 1 is _____ hundred(s) or _____.
the value of 8 is _____ thousands or _____.

(8) In the number 689.....
the value of 9 is _____ ones or _____.
the value of 8 is _____ tens or _____.
the value of 6 is _____ hundreds or _____.

(9) In the number 38,496.....
the value of 6 is _____ ones or _____.
the value of 9 is _____ tens or _____.
the value of 4 is _____ hundreds or _____.
the value of 38 is _____ thousands or _____.

(10) In the number 379.....
the value of 9 is _____ ones or _____.
the value of 7 is _____ tens or _____.
the value of 3 is _____ hundreds or _____.

Activity 2 - Place Values and Whole Numbers (continued)

Directions: Answer the following by placing the correct digit in the space.

1. 561 Which digit is in the tens place? ________
2. 780 Which digit is in the hundreds place? ________
3. 42,625 Which digit is in the ten thousands place? ________
4. 3,439 Which digit is in the hundreds place? ________
5. 657,524 Which digit is in the thousands place? ________
6. 4,075 Which digit is in the units place? ________
7. 7,302 Wich digit is in the hundreds place? ________
8. 428,713 Which digit is in the hundred thousands place? ________
9. 9,371,246 Which digit is in the millions place? ________
10. 32,584 Which digit is in the units place? ________
11. 529,682 Which digit is in the thousands place? ________
12. 115,035 Which digit is in the hundred thousands place? ________
13. 8,851 Which digit is in the tens place? ________
14. 738,495 Which digit is in the ten thousands place? ________
15. 2,700,920 Which digit is in the millions place? ________

Activity 2 - Place Values and Whole Numbers (continued)

Directions: Show the place value of the following numbers by writing the digits correctly on the chart. An example has been completed for you.
EXAMPLE: 7,654

	Millions	Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones
				7	6	5	4
1.							
2.							
3.							
4.							
5.							
6.							
7.							
8.							
9.							
10.							
11.							
12.							
13.							
14.							
15.							
16.							
17.							
18.							
19.							
20.							

Activity 2 - Place Values and Whole Numbers (continued)

EXAMPLE	7,654
1.	6,700
2.	53,426
3.	74,803,000
4.	175
5.	32,072
6.	8,115,035
7.	3,582
8.	493
9.	358,281
10.	1,661
11.	105,302
12.	29,547
13.	284
14.	135,011
15.	22,314
16.	321
17.	387,611
18.	88,027
19.	2,700,920
20.	4,228

Cluster
Applied Math

Activity 3 - Reading and Writing Whole Numbers

Objective(s): This activity will enable participants to read and write whole numbers.

Materials Required:
Pencil

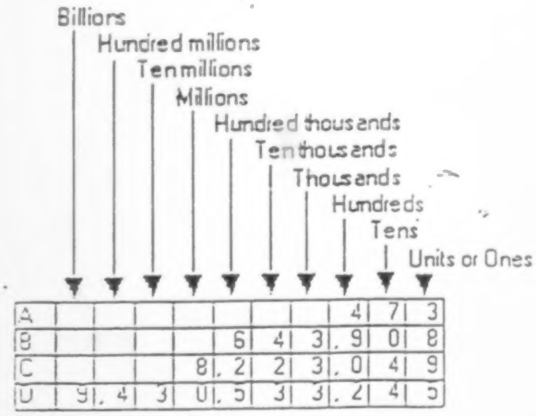
You need to know:

1. Usually the numbers with four digits or more are written with commas after every three digits, counting from right to left.
   EXAMPLE: 71230645
   71,230,645

2. Four-digit numbers are an exception to the rule. Commas are not required in four-digit numbers.
   EXAMPLE: 3743 AND 3,743

   Both are acceptable ways of writing the same number.

3. The numbers in the chart are read as follows:


Billions
Hundred millions
Ten millions
Millions
Hundred thousands
Ten thousands
Thousands
Hundreds
Tens
Units or Ones

	Billions	Hundred millions	Ten millions	Millions	Hundred thousands	Ten thousands	Thousands	Hundreds	Tens	Units or Ones
A								4	7	3
B					6	4	3,	9	0	8
C				8,	2	2	3,	0	4	9
D	9,	4	3	0,	5	3	3,	2	4	5

A. Four hundred seventy three. Note that the 4 is in the "hundreds" column, 7 is in the "tens" column, and 3 is in the "ones" column.

B. Six hundred forty-three thousand, nine hundred eight.

C. Eight million, two hundred twenty three thousand, forty nine.

D. Nine billion, four hundred thirty million, five hundred thirty-three thousand, two hundred forty-five.

Activity 3 - Reading and Writing Whole Numbers (continued)

You need to know:

4. Numbers can be written in words, in an expanded form, or as a numeral.

EXAMPLE:
1,689
One thousand, six hundred eighty nine
$1000+600+80+9$
1,689

Activity 3 - Reading and Writing Whole Numbers (continued)

Directions:

1. At the instructor's request, read the following numbers aloud.

2. On the following page, write out each number in words, in the blanks provided.

1. 8,497
2. 742,351
3. 932,617
4. 7,639,792
5. 25,816
6. 173,855
7. 6,382,523
8. 782,386
9. 1,175,140
10. 97,268
11. 6,973
12. 382
13. 4,880
14. 14,228,786
15. 865
16. 97,268
17. 243
18. 27,268
19. 1,478
20. 257
21. 4,321
22. 28
23. 5,504
24. 457
25. 39
26. 847
27. 386
28. 2,131
29. 159
30. 14
31. 249,382
32. 360
33. 829
34. 247,427,820
35. 37
36. 89,827
37. 22,809
38. 88
39. 738,264,699
40. 758

Activity 3 - Reading and Writing Whole Numbers (continued)

1. ________________________________
2. ________________________________
3. ________________________________
4. ________________________________
5. ________________________________
6. ________________________________
7. ________________________________
8. ________________________________
9. ________________________________
10. ________________________________
11. ________________________________
12. ________________________________
13. ________________________________
14. ________________________________
15. ________________________________
16. ________________________________
17. ________________________________
18. ________________________________
19. ________________________________
20. ________________________________

Activity 3 - Reading and Writing Whole Numbers (continued)

21. ____________________
22. ____________________
23. ____________________
24. ____________________
25. ____________________
26. ____________________
27. ____________________
28. ____________________
29. ____________________
30. ____________________
31. ____________________
32. ____________________
33. ____________________
34. ____________________
35. ____________________
36. ____________________
37. ____________________
38. ____________________
39. ____________________
40. ____________________

Activity 3 - Reading and Writing Whole Numbers (continued)

Directions:
Write the following numbers, using figures, in the chart below. Make sure you put each digit in the correct column. Insert commas, where applicable.

	Billions	Hundred Millions	Ten Millions	Millions	Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Units or Ones
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										

1. thirty-four thousand eighty six
2. eight hundred two
3. sixty-three thousand five hundred twenty-two
4. three hundred thirty nine
5. seven thousand seven hundred forty
6. nine million eight hundred twenty-three thousand five hundred twenty-seven
7. five hundred seventy eight
8. one hundred thirty five thousand eight hundred fifty one
9. forty-nine thousand seven hundred thirty-six
10. thirteen million four hundred thirty-six thousand nine hundred thirty-two
11. two thousand five hundred fifteen
12. two hundred four thousand nine hundred seventy-two
13. nine hundred ninety-eight thousand five hundred sixty
14. four thousand eighty-two
15. five thousand one hundred twelve

Activity 4 - Adding Whole Numbers

Objective(s): This activity will enable participants
(1) to add whole numbers in order to find the total amount.
(2) to check addition answers.

Materials Required:
Pencil
Scratch Paper

You need to know:

1. Addition problems are done daily. For example, you might add the "tare" weight and the full weight together, add the proper amount of ingredient when recipes change, or add weights of two ingredients when both are combined in the same bucket.

2. Addition is combining two or more quantities (amounts) to find a total quantity (amount). The answer is called the <u>sum</u>.

3. When adding, the order of the numbers does not matter. For example, 2 + 6 = 6 + 2.

4. To add numbers greater than 10, arrange them in columns and <u>regroup</u> (borrow and carry).

5. To check addition answers, add the columns in the opposite direction. So if you started at the top and added downward, start at the bottom and add upward.

```
EXAMPLE:                              CHECK:
 45     (1)  5 + 3 = 8                 45        (1)  3 + 5 = 8
+33     (2)  4 + 3 = 7                +33        (2)  3 + 4 = 7
------                                ------
 78                                    78
```

Activity 4 - Adding Whole Numbers (continued)

You need to know:

6. To add whole numbers:

A. Write the numbers under one another with each digit in the problem column.

4	6	2	5
	4	2	3
	5	7	4
3	2	5	1

B. Add the ones column:
5+3+4+1=13
Write down the 3 and carry the 1 to the tens column.

		(1)	
4	6	2	5
	4	2	5
	5	7	4
3	2	5	1
			3

C. Add the tens column:
1 (from the ones column) +2+2+7+5=17
Write down the 7 and carry the 1 to the hundreds column.

	(1)	(1)	
4	6	2	5
	4	2	3
	5	7	4
3	2	5	1
		7	3

D. Add the hundreds column:
1 (from the tens column) +6+4+5+2=18
Write down the 8 and carry the 1 to the thousands column.

(1)	(1)	(1)	
4	6	2	5
	4	2	3
	5	7	4
3	2	5	1
	8	7	3

E. Add the thousands column:
1 (from the hundreds column) +4+3=8
Write down the 8. The sum is 8873.

(1)	(1)	(1)	
4	6	2	5
	4	2	3
	5	7	4
3	2	5	1
8	8	7	3

F. Continue the same process with the remaining columns, if applicable.

Activity 4 - Adding Whole Numbers

(1) Directions: Add.

1. $\begin{array}{r} 3 \\ +\ 5 \\ \hline \end{array}$ $\quad \begin{array}{r} 5 \\ +\ 0 \\ \hline \end{array}$ $\quad \begin{array}{r} 2 \\ +\ 6 \\ \hline \end{array}$ $\quad \begin{array}{r} 1 \\ +\ 5 \\ \hline \end{array}$ $\quad \begin{array}{r} 0 \\ +\ 2 \\ \hline \end{array}$

2. $\begin{array}{r} 1 \\ +\ 8 \\ \hline \end{array}$ $\quad \begin{array}{r} 4 \\ +\ 5 \\ \hline \end{array}$ $\quad \begin{array}{r} 3 \\ +\ 5 \\ \hline \end{array}$ $\quad \begin{array}{r} 2 \\ +\ 6 \\ \hline \end{array}$ $\quad \begin{array}{r} 0 \\ +\ 8 \\ \hline \end{array}$

3. $\begin{array}{r} 2 \\ +\ 2 \\ \hline \end{array}$ $\quad \begin{array}{r} 5 \\ +\ 3 \\ \hline \end{array}$ $\quad \begin{array}{r} 3 \\ +\ 6 \\ \hline \end{array}$ $\quad \begin{array}{r} 6 \\ +\ 1 \\ \hline \end{array}$ $\quad \begin{array}{r} 3 \\ +\ 3 \\ \hline \end{array}$

4. $\begin{array}{r} 1 \\ +\ 2 \\ \hline \end{array}$ $\quad \begin{array}{r} 4 \\ +\ 3 \\ \hline \end{array}$ $\quad \begin{array}{r} 1 \\ +\ 1 \\ \hline \end{array}$ $\quad \begin{array}{r} 5 \\ +\ 2 \\ \hline \end{array}$ $\quad \begin{array}{r} 4 \\ +\ 1 \\ \hline \end{array}$

5. $\begin{array}{r} 7 \\ +\ 1 \\ \hline \end{array}$ $\quad \begin{array}{r} 6 \\ +\ 3 \\ \hline \end{array}$ $\quad \begin{array}{r} 9 \\ +\ 0 \\ \hline \end{array}$ $\quad \begin{array}{r} 2 \\ +\ 7 \\ \hline \end{array}$ $\quad \begin{array}{r} 3 \\ +\ 4 \\ \hline \end{array}$

Activity 4 - Adding Whole Numbers

(2) Directions: Add.

1. $\begin{array}{r} 3 \\ +\ 9 \\ \hline \end{array} \quad \begin{array}{r} 5 \\ +\ 7 \\ \hline \end{array} \quad \begin{array}{r} 9 \\ +\ 9 \\ \hline \end{array} \quad \begin{array}{r} 8 \\ +\ 4 \\ \hline \end{array} \quad \begin{array}{r} 3 \\ +\ 8 \\ \hline \end{array}$

2. $\begin{array}{r} 8 \\ +\ 7 \\ \hline \end{array} \quad \begin{array}{r} 6 \\ +\ 6 \\ \hline \end{array} \quad \begin{array}{r} 7 \\ +\ 3 \\ \hline \end{array} \quad \begin{array}{r} 5 \\ +\ 9 \\ \hline \end{array} \quad \begin{array}{r} 5 \\ +\ 5 \\ \hline \end{array}$

3. $\begin{array}{r} 4 \\ +\ 6 \\ \hline \end{array} \quad \begin{array}{r} 9 \\ +\ 2 \\ \hline \end{array} \quad \begin{array}{r} 7 \\ +\ 6 \\ \hline \end{array} \quad \begin{array}{r} 5 \\ +\ 6 \\ \hline \end{array} \quad \begin{array}{r} 4 \\ +\ 9 \\ \hline \end{array}$

4. $\begin{array}{r} 3 \\ +\ 2 \\ \hline \end{array} \quad \begin{array}{r} 5 \\ +\ 4 \\ \hline \end{array} \quad \begin{array}{r} 6 \\ +\ 0 \\ \hline \end{array} \quad \begin{array}{r} 6 \\ +\ 3 \\ \hline \end{array} \quad \begin{array}{r} 4 \\ +\ 5 \\ \hline \end{array}$

5. $\begin{array}{r} 8 \\ +\ 8 \\ \hline \end{array} \quad \begin{array}{r} 6 \\ +\ 8 \\ \hline \end{array} \quad \begin{array}{r} 9 \\ +\ 7 \\ \hline \end{array} \quad \begin{array}{r} 8 \\ +\ 5 \\ \hline \end{array} \quad \begin{array}{r} 7 \\ +\ 7 \\ \hline \end{array}$

Activity 4 - Adding Whole Numbers

(3) Directions: Add.

1.

$$\begin{array}{r} 6\\ 4\\ +\ 5\\ \hline \end{array} \qquad \begin{array}{r} 9\\ 6\\ +\ 6\\ \hline \end{array} \qquad \begin{array}{r} 2\\ 3\\ +\ 8\\ \hline \end{array} \qquad \begin{array}{r} 1\\ 9\\ +\ 4\\ \hline \end{array} \qquad \begin{array}{r} 6\\ 2\\ +\ 3\\ \hline \end{array}$$

2.

$$\begin{array}{r} 8\\ 6\\ +\ 7\\ \hline \end{array} \qquad \begin{array}{r} 7\\ 0\\ +\ 6\\ \hline \end{array} \qquad \begin{array}{r} 9\\ 1\\ +\ 8\\ \hline \end{array} \qquad \begin{array}{r} 5\\ 2\\ +\ 2\\ \hline \end{array} \qquad \begin{array}{r} 8\\ 5\\ +\ 9\\ \hline \end{array}$$

3.

$$\begin{array}{r} 4\\ 9\\ 8\\ +\ 1\\ \hline \end{array} \qquad \begin{array}{r} 5\\ 6\\ 7\\ +\ 6\\ \hline \end{array} \qquad \begin{array}{r} 3\\ 4\\ 8\\ +\ 9\\ \hline \end{array} \qquad \begin{array}{r} 4\\ 3\\ 8\\ +\ 8\\ \hline \end{array} \qquad \begin{array}{r} 9\\ 7\\ 3\\ +\ 7\\ \hline \end{array}$$

4.

$$\begin{array}{r} 8\\ 6\\ 8\\ +\ 4\\ \hline \end{array} \qquad \begin{array}{r} 3\\ 2\\ 7\\ +\ 6\\ \hline \end{array} \qquad \begin{array}{r} 5\\ 5\\ 1\\ +\ 0\\ \hline \end{array} \qquad \begin{array}{r} 9\\ 6\\ 5\\ +\ 7\\ \hline \end{array} \qquad \begin{array}{r} 6\\ 7\\ 2\\ +\ 3\\ \hline \end{array}$$

Activity 4 - Adding Whole Numbers

(4) Directions: Add.

1.	2	18	3	14	5	61	3	62	5	9
	+ 95	+ 9	+ 35	+ 3	+ 37	+ 5	+ 13	+ 9	+ 36	+ 47
2.	11	15	18	12	17	14	19	16	13	18
	+ 2	+ 9	+ 7	+ 5	+ 8	+ 6	+ 4	+ 1	+ 5	+ 9
3.	72	86	93	2	5	7	84	96	57	3
	+ 4	+ 9	+ 3	+ 75	+ 88	+ 99	+ 1	+ 6	+ 9	+ 37
4.	23	2	21	1	28	7	29	6	26	9
	+ 4	+ 26	+ 3	+ 25	+ 8	+ 24	+ 5	+ 22	+ 8	+ 27
5.	4	5	97	3	2	76	6	7	49	8
	+ 73	+ 89	+ 8	+ 56	+ 66	+ 1	+ 82	+ 94	+ 5	+ 39
6.	48	54	7	78	83	3	41	52	4	28
	+ 6	+ 2	+ 67	+ 9	+ 4	+ 91	+ 1	+ 8	+ 37	+ 6
7.	1	8	7	6	4	2	9	5	3	7
	+ 37	+ 34	+ 32	+ 39	+ 31	+ 35	+ 38	+ 33	+ 36	+ 38

Activity 4 - Adding Whole Numbers

(5) Directions: Add.

1.	1	6	42	59	9	2	87	98	3	5
	+ 23	+ 34	+ 7	+ 4	+ 69	+ 74	+ 3	+ 8	+ 98	+ 59
2.	41	1	42	2	44	7	46	6	48	9
	+ 5	+ 48	+ 8	+ 47	+ 9	+ 49	+ 4	+ 43	+ 5	+ 46
3.	29	33	1	8	22	36	2	6	64	5
	+ 5	+ 9	+ 45	+ 19	+ 7	+ 4	+ 16	+ 27	+ 8	+ 37
4.	5	52	1	59	7	4	58	51	9	53
	+ 56	+ 9	+ 54	+ 8	+ 53	+ 55	+ 2	+ 6	+ 58	+ 9
5.	3	27	36	45	3	8	2	95	38	7
	+ 13	+ 9	+ 3	+ 3	+ 57	+ 63	+ 89	+ 8	+ 3	+ 26
6.	5	51	2	17	9	38	4	57	9	47
	+ 46	+ 1	+ 65	+ 8	+ 24	+ 7	+ 43	+ 6	+ 75	+ 6
7.	62	66	7	4	69	64	3	5	64	68
	+ 1	+ 6	+ 61	+ 67	+ 9	+ 2	+ 68	+ 65	+ 6	+ 6

Activity 4 - Adding Whole Numbers

(6) Directions: Add.

1.	25 + 1	8 + 31	49 + 7	6 + 58	63 + 4	2 + 77	12 + 9	5 + 28	39 + 6	7 + 38
2.	6 + 75	72 + 2	76 + 7	9 + 73	4 + 78	77 + 5	88 + 5	8 + 86	9 + 84	6 + 45
3.	11 + 9	26 + 7	32 + 5	47 + 8	53 + 6	64 + 4	79 + 3	85 + 1	96 + 2	37 + 5
4.	87 + 6	7 + 85	4 + 92	9 + 96	99 + 3	93 + 2	97 + 7	6 + 98	5 + 98	7 + 96
5.	4 + 15	2 + 21	3 + 39	1 + 44	8 + 55	7 + 68	5 + 71	6 + 81	9 + 89	8 + 46
6.	23 + 6	9 + 34	42 + 7	7 + 59	69 + 4	8 + 77	97 + 5	9 + 95	9 + 88	97 + 9
7.	1 30 + 9	5 47 + 8	2 81 + 5	3 25 + 6	6 52 + 9	5 83 + 4	2 56 + 5	9 37 + 8	8 36 + 7	6 84 + 5

Activity 4 - Adding Whole Numbers

(7) **Rows 1 - 5** Directions: Add and check

1. $\begin{array}{r}38\\+\ \underline{21}\end{array}\qquad\begin{array}{r}57\\+\ \underline{32}\end{array}\qquad\begin{array}{r}45\\+\ \underline{\ \ 3}\end{array}\qquad\begin{array}{r}32\\+\ \underline{25}\end{array}$

2. $\begin{array}{r}28\\+\ \underline{49}\end{array}\qquad\begin{array}{r}83\\+\ \underline{46}\end{array}\qquad\begin{array}{r}37\\+\ \underline{86}\end{array}\qquad\begin{array}{r}29\\+\ \underline{45}\end{array}$

3. $\begin{array}{r}68\\+\ \underline{49}\end{array}\qquad\begin{array}{r}56\\+\ \underline{71}\end{array}\qquad\begin{array}{r}64\\+\ \underline{28}\end{array}\qquad\begin{array}{r}39\\+\ \underline{42}\end{array}$

4. $\begin{array}{r}37\\+\ \underline{22}\end{array}\qquad\begin{array}{r}59\\+\ \underline{76}\end{array}\qquad\begin{array}{r}83\\+\ \underline{24}\end{array}\qquad\begin{array}{r}55\\+\ \underline{99}\end{array}$

5. $\begin{array}{r}93\\+\ \underline{14}\end{array}\qquad\begin{array}{r}26\\+\ \underline{53}\end{array}\qquad\begin{array}{r}29\\+\ \underline{84}\end{array}\qquad\begin{array}{r}53\\+\ \underline{28}\end{array}$

Activity 4 - Adding Whole Numbers

(7) **Rows 6- 10** Directions: Add and check

6.	42 + 54	34 + 28	37 + 61	24 + 13
7.	28 + 73	53 + 68	67 + 31	13 + 78
8.	31 + 28	93 + 15	59 + 83	82 + 71
9.	47 + 26	93 + 28	66 + 32	28 + 48
10.	65 + 27	47 + 68	74 + 16	55 + 29

Activity 4 - Adding Whole Numbers

(7) **Rows 11 - 15** Directions: Add and check

11.	84 + 29	55 + 89	83 + 15	25 + 39
12.	19 + 47	82 + 36	31 + 45	74 + 26
13.	64 + 28	23 + 88	65 + 87	56 + 49
14.	75 + 78	43 + 88	39 + 29	74 + 23
15.	98 + 43	39 + 26	93 + 28	96 + 16

Activity 4 - Adding Whole Numbers

(7) **Rows 16 - 20** Directions: Add and check

16.	66 + 45	24 + 63	57 + 14	92 + 79
17.	61 + 26	65 + 27	48 + 56	14 + 2
18.	32 + 19	39 + 87	29 + 50	47 + 24
19.	13 + 41	59 + 26	25 + 3	17 + 79
20.	72 + 24	44 + 36	46 + 2	38 + 25

Activity 4 - Adding Whole Numbers

(8) **Rows 1 - 5** Directions: Add and check.

1. $$\begin{array}{r} 78 \\ +\ \underline{25} \end{array} \qquad \begin{array}{r} 37 \\ +\ \underline{69} \end{array} \qquad \begin{array}{r} 82 \\ +\ \underline{14} \end{array}$$

2. $$\begin{array}{r} 59 \\ +\ \underline{67} \end{array} \qquad \begin{array}{r} 32 \\ +\ \underline{49} \end{array} \qquad \begin{array}{r} 55 \\ +\ \underline{63} \end{array}$$

3. $$\begin{array}{r} 23 \\ +\ \underline{89} \end{array} \qquad \begin{array}{r} 74 \\ +\ \underline{25} \end{array} \qquad \begin{array}{r} 93 \\ +\ \underline{25} \end{array}$$

4. $$\begin{array}{r} 61 \\ +\ \underline{28} \end{array} \qquad \begin{array}{r} 24 \\ +\ \underline{57} \end{array} \qquad \begin{array}{r} 28 \\ +\ \underline{16} \end{array}$$

5. $$\begin{array}{r} 54 \\ +\ \underline{78} \end{array} \qquad \begin{array}{r} 69 \\ +\ \underline{23} \end{array} \qquad \begin{array}{r} 51 \\ +\ \underline{28} \end{array}$$

Activity 4 - Adding Whole Numbers

(8) **Rows 6 - 10** Directions: Add and check.

6. $\begin{array}{r} 73 \\ +\ 69 \\ \hline \end{array}$ $\qquad$ $\begin{array}{r} 84 \\ +\ 28 \\ \hline \end{array}$ $\qquad$ $\begin{array}{r} 62 \\ +\ 48 \\ \hline \end{array}$

7. $\begin{array}{r} 87 \\ +\ 91 \\ \hline \end{array}$ $\qquad$ $\begin{array}{r} 48 \\ +\ 26 \\ \hline \end{array}$ $\qquad$ $\begin{array}{r} 53 \\ +\ 97 \\ \hline \end{array}$

8. $\begin{array}{r} 68 \\ +\ 54 \\ \hline \end{array}$ $\qquad$ $\begin{array}{r} 83 \\ +\ 17 \\ \hline \end{array}$ $\qquad$ $\begin{array}{r} 75 \\ +\ 29 \\ \hline \end{array}$

9. $\begin{array}{r} 74 \\ +\ 28 \\ \hline \end{array}$ $\qquad$ $\begin{array}{r} 68 \\ +\ 93 \\ \hline \end{array}$ $\qquad$ $\begin{array}{r} 95 \\ +\ 82 \\ \hline \end{array}$

10. $\begin{array}{r} 46 \\ +\ 83 \\ \hline \end{array}$ $\qquad$ $\begin{array}{r} 72 \\ +\ 96 \\ \hline \end{array}$ $\qquad$ $\begin{array}{r} 47 \\ +\ 84 \\ \hline \end{array}$

Activity 4 - Adding Whole Numbers

(8) **Rows 11 - 15** Directions: Add and check

11.	92 + 15	73 + 16	29 + 33	34 + 69
12.	45 + 57	63 + 98	37 + 69	84 + 57
13.	36 + 83	24 + 47	71 + 98	64 + 36
14.	49 + 87	63 + 29	62 + 79	65 + 97
15.	26 + 75	38 + 44	83 + 29	58 + 46

Activity 4 - Adding Whole Numbers

(9) Directions: Add and check.

1. $\begin{array}{r} 68 \\ +\ 580 \\ \hline \end{array}$ $\quad$ $\begin{array}{r} 72 \\ +\ 469 \\ \hline \end{array}$ $\quad$ $\begin{array}{r} 93 \\ +\ 708 \\ \hline \end{array}$ $\quad$ $\begin{array}{r} 87 \\ +\ 506 \\ \hline \end{array}$

2. $\begin{array}{r} 748 \\ +\ 87 \\ \hline \end{array}$ $\quad$ $\begin{array}{r} 825 \\ +\ 59 \\ \hline \end{array}$ $\quad$ $\begin{array}{r} 346 \\ +\ 64 \\ \hline \end{array}$ $\quad$ $\begin{array}{r} 293 \\ +\ 53 \\ \hline \end{array}$

3. $\begin{array}{r} 41 \\ +\ 289 \\ \hline \end{array}$ $\quad$ $\begin{array}{r} 57 \\ +\ 418 \\ \hline \end{array}$ $\quad$ $\begin{array}{r} 53 \\ +\ 469 \\ \hline \end{array}$ $\quad$ $\begin{array}{r} 64 \\ +\ 377 \\ \hline \end{array}$

4. $\begin{array}{r} 302 \\ +\ 83 \\ \hline \end{array}$ $\quad$ $\begin{array}{r} 729 \\ +\ 50 \\ \hline \end{array}$ $\quad$ $\begin{array}{r} 655 \\ +\ 43 \\ \hline \end{array}$

Activity 4 - Adding Whole Numbers

(10) Directions: Add and check.

1.	56 + 811	34 + 205	80 + 709	482 + 16
2.	314 + 98	283 + 56	607 + 95	966 + 35
3.	53 + 436	13 + 206	62 + 914	47 + 532
4.	946 + 32	415 + 61	723 + 75	

Activity 4 - Adding Whole Numbers

(11) Directions: Add and check.

1. $$\begin{array}{r} 66 \\ 81 \\ +\ 56 \\ \hline \end{array} \qquad \begin{array}{r} 21 \\ 49 \\ +\ 43 \\ \hline \end{array} \qquad \begin{array}{r} 89 \\ 67 \\ +\ 50 \\ \hline \end{array} \qquad \begin{array}{r} 92 \\ 10 \\ +\ 39 \\ \hline \end{array}$$

2. $$\begin{array}{r} 87 \\ 19 \\ +\ 72 \\ \hline \end{array} \qquad \begin{array}{r} 60 \\ 54 \\ +\ 38 \\ \hline \end{array} \qquad \begin{array}{r} 31 \\ 28 \\ +\ 44 \\ \hline \end{array} \qquad \begin{array}{r} 79 \\ 96 \\ +\ 83 \\ \hline \end{array}$$

3. $$\begin{array}{r} 70 \\ 57 \\ +\ 202 \\ \hline \end{array} \qquad \begin{array}{r} 51 \\ 91 \\ +\ 329 \\ \hline \end{array} \qquad \begin{array}{r} 42 \\ 93 \\ +\ 516 \\ \hline \end{array} \qquad \begin{array}{r} 78 \\ 12 \\ +\ 490 \\ \hline \end{array}$$

4. $$\begin{array}{r} 63 \\ 85 \\ +\ 854 \\ \hline \end{array} \qquad \begin{array}{r} 84 \\ 43 \\ +\ 977 \\ \hline \end{array} \qquad \begin{array}{r} 20 \\ 74 \\ +\ 627 \\ \hline \end{array} \qquad \begin{array}{r} 95 \\ 80 \\ +\ 417 \\ \hline \end{array}$$

Activity 4 - Adding Whole Numbers

(12) Directions: Add and check.

1.

$$\begin{array}{r}91\\31\\78\\+\ \ 66\\\hline\end{array}\qquad\qquad\begin{array}{r}15\\75\\76\\+\ \ 31\\\hline\end{array}\qquad\qquad\begin{array}{r}23\\22\\87\\+\ \ 99\\\hline\end{array}$$

2.

$$\begin{array}{r}646\\60\\52\\+\ \ 944\\\hline\end{array}\qquad\qquad\begin{array}{r}930\\15\\37\\+\ \ 376\\\hline\end{array}\qquad\qquad\begin{array}{r}347\\38\\67\\+\ \ 421\\\hline\end{array}$$

3.

$$\begin{array}{r}94\\21\\39\\45\\+\ \ 80\\\hline\end{array}\qquad\qquad\begin{array}{r}40\\83\\26\\29\\+\ \ 33\\\hline\end{array}\qquad\qquad\begin{array}{r}27\\40\\67\\28\\+\ \ 86\\\hline\end{array}$$

4.

$$\begin{array}{r}57\\35\\12\\83\\+\ \ 58\\\hline\end{array}\qquad\qquad\begin{array}{r}43\\51\\74\\32\\+\ \ 36\\\hline\end{array}\qquad\qquad\begin{array}{r}86\\65\\84\\46\\+\ \ 97\\\hline\end{array}$$

Activity 4 - Adding Whole Numbers

(13) **Rows 1- 5** Directions: Add and check.

1. $\begin{array}{r} 603 \\ +\ 285 \\ \hline \end{array}$ $\begin{array}{r} 577 \\ +\ 321 \\ \hline \end{array}$ $\begin{array}{r} 458 \\ +\ 201 \\ \hline \end{array}$ $\begin{array}{r} 413 \\ +\ 564 \\ \hline \end{array}$

2. $\begin{array}{r} 805 \\ +\ 163 \\ \hline \end{array}$ $\begin{array}{r} 761 \\ +\ 135 \\ \hline \end{array}$ $\begin{array}{r} 432 \\ +\ 245 \\ \hline \end{array}$ $\begin{array}{r} 854 \\ +\ 133 \\ \hline \end{array}$

3. $\begin{array}{r} 345 \\ +\ 698 \\ \hline \end{array}$ $\begin{array}{r} 254 \\ +\ 736 \\ \hline \end{array}$ $\begin{array}{r} 829 \\ +\ 847 \\ \hline \end{array}$ $\begin{array}{r} 378 \\ +\ 692 \\ \hline \end{array}$

4. $\begin{array}{r} 748 \\ +\ 642 \\ \hline \end{array}$ $\begin{array}{r} 293 \\ +\ 718 \\ \hline \end{array}$ $\begin{array}{r} 786 \\ +\ 692 \\ \hline \end{array}$ $\begin{array}{r} 267 \\ +\ 541 \\ \hline \end{array}$

5. $\begin{array}{r} 843 \\ +\ 927 \\ \hline \end{array}$ $\begin{array}{r} 298 \\ +\ 354 \\ \hline \end{array}$ $\begin{array}{r} 674 \\ +\ 732 \\ \hline \end{array}$ $\begin{array}{r} 235 \\ +\ 872 \\ \hline \end{array}$

Activity 4 - Adding Whole Numbers

(13) **Rows 6 - 10** Directions: Add and check.

6.	$\begin{array}{r} 762 \\ +\ 125 \\ \hline \end{array}$	$\begin{array}{r} 210 \\ +\ 648 \\ \hline \end{array}$	$\begin{array}{r} 307 \\ +\ 652 \\ \hline \end{array}$	$\begin{array}{r} 386 \\ +\ 402 \\ \hline \end{array}$	$\begin{array}{r} 138 \\ +\ 844 \\ \hline \end{array}$
7.	$\begin{array}{r} 328 \\ +\ 560 \\ \hline \end{array}$	$\begin{array}{r} 415 \\ +\ 383 \\ \hline \end{array}$	$\begin{array}{r} 574 \\ +\ 692 \\ \hline \end{array}$	$\begin{array}{r} 925 \\ +\ 381 \\ \hline \end{array}$	$\begin{array}{r} 558 \\ +\ 649 \\ \hline \end{array}$
8.	$\begin{array}{r} 493 \\ +\ 386 \\ \hline \end{array}$	$\begin{array}{r} 254 \\ +\ 255 \\ \hline \end{array}$	$\begin{array}{r} 368 \\ +\ 645 \\ \hline \end{array}$	$\begin{array}{r} 758 \\ +\ 452 \\ \hline \end{array}$	$\begin{array}{r} 423 \\ +\ 468 \\ \hline \end{array}$
9.	$\begin{array}{r} 475 \\ +\ 321 \\ \hline \end{array}$	$\begin{array}{r} 347 \\ +\ 433 \\ \hline \end{array}$	$\begin{array}{r} 425 \\ +\ 716 \\ \hline \end{array}$	$\begin{array}{r} 129 \\ +\ 632 \\ \hline \end{array}$	
10.	$\begin{array}{r} 328 \\ +\ 972 \\ \hline \end{array}$	$\begin{array}{r} 523 \\ +\ 476 \\ \hline \end{array}$	$\begin{array}{r} 215 \\ +\ 256 \\ \hline \end{array}$	$\begin{array}{r} 548 \\ +\ 627 \\ \hline \end{array}$	

Activity 4 - Adding Whole Numbers

(14) **Rows 1 - 5** Directions: Add and check.

1.	786 + 394	928 + 782	475 + 698	378 + 257
2.	378 + 269	543 + 786	834 + 729	541 + 269
3.	287 + 465	387 + 298	546 + 589	728 + 569
4.	384 + 429	968 + 518	652 + 478	409 + 583
5.	740 + 893	584 + 427	637 + 905	842 + 369

Activity 4 - Adding Whole Numbers

(14) **Rows 6 - 11** Directions: Add and check.

6.	$\begin{array}{r}683\\+\ 417\\\hline\end{array}$	$\begin{array}{r}257\\+\ 683\\\hline\end{array}$	$\begin{array}{r}594\\+\ 417\\\hline\end{array}$	$\begin{array}{r}267\\+\ 936\\\hline\end{array}$
7.	$\begin{array}{r}405\\+\ 561\\\hline\end{array}$	$\begin{array}{r}216\\+\ 423\\\hline\end{array}$	$\begin{array}{r}537\\+\ 252\\\hline\end{array}$	$\begin{array}{r}640\\+\ 118\\\hline\end{array}$
8.	$\begin{array}{r}689\\+\ 836\\\hline\end{array}$	$\begin{array}{r}546\\+\ 921\\\hline\end{array}$	$\begin{array}{r}786\\+\ 293\\\hline\end{array}$	$\begin{array}{r}548\\+\ 687\\\hline\end{array}$
9.	$\begin{array}{r}834\\+\ 785\\\hline\end{array}$	$\begin{array}{r}692\\+\ 847\\\hline\end{array}$	$\begin{array}{r}716\\+\ 263\\\hline\end{array}$	$\begin{array}{r}408\\+\ 241\\\hline\end{array}$
10.	$\begin{array}{r}715\\+\ 486\\\hline\end{array}$	$\begin{array}{r}709\\+\ 983\\\hline\end{array}$	$\begin{array}{r}607\\+\ 406\\\hline\end{array}$	$\begin{array}{r}219\\+\ 389\\\hline\end{array}$
11.	$\begin{array}{r}885\\+\ 102\\\hline\end{array}$	$\begin{array}{r}235\\+\ 452\\\hline\end{array}$		

Activity 4 - Adding Whole Numbers

(16) Directions: Add and check.

1.

$$\begin{array}{r} 146 \\ 73 \\ +\ 718 \\ \hline \end{array} \qquad \begin{array}{r} 243 \\ 10 \\ +\ 256 \\ \hline \end{array} \qquad \begin{array}{r} 880 \\ 77 \\ +\ 523 \\ \hline \end{array}$$

2.

$$\begin{array}{r} 367 \\ 520 \\ +\ 124 \\ \hline \end{array} \qquad \begin{array}{r} 236 \\ 153 \\ +\ 875 \\ \hline \end{array} \qquad \begin{array}{r} 413 \\ 648 \\ +\ 381 \\ \hline \end{array} \qquad \begin{array}{r} 223 \\ 209 \\ +\ 574 \\ \hline \end{array}$$

3.

$$\begin{array}{r} 175 \\ 263 \\ +\ 421 \\ \hline \end{array} \qquad \begin{array}{r} 357 \\ 113 \\ +\ 318 \\ \hline \end{array} \qquad \begin{array}{r} 526 \\ 683 \\ +\ 347 \\ \hline \end{array} \qquad \begin{array}{r} 162 \\ 842 \\ +\ 682 \\ \hline \end{array} \qquad \begin{array}{r} 845 \\ 464 \\ +\ 573 \\ \hline \end{array}$$

4.

$$\begin{array}{r} 316 \\ 470 \\ +\ 211 \\ \hline \end{array} \qquad \begin{array}{r} 214 \\ 275 \\ +\ 463 \\ \hline \end{array} \qquad \begin{array}{r} 817 \\ 646 \\ +\ 373 \\ \hline \end{array} \qquad \begin{array}{r} 552 \\ 673 \\ +\ 631 \\ \hline \end{array} \qquad \begin{array}{r} 621 \\ 897 \\ +\ 973 \\ \hline \end{array}$$

Activity 4 - Adding Whole Numbers

(17) Directions: Use scratch paper to add these numbers. Use your calculator to check your answers.

1.

$$\begin{array}{r}685\\691\\274\\+\ 394\\\hline\end{array}\qquad\begin{array}{r}597\\283\\406\\+\ 938\\\hline\end{array}\qquad\begin{array}{r}263\\161\\247\\+\ 459\\\hline\end{array}\qquad\begin{array}{r}760\\218\\322\\+\ 938\\\hline\end{array}\qquad\begin{array}{r}461\\919\\653\\+\ 597\\\hline\end{array}\qquad\begin{array}{r}298\\709\\395\\+\ 471\\\hline\end{array}$$

2.

$$\begin{array}{r}518\\782\\764\\207\\+\ 843\\\hline\end{array}\qquad\begin{array}{r}114\\726\\953\\199\\+\ 727\\\hline\end{array}\qquad\begin{array}{r}806\\992\\528\\666\\+\ 894\\\hline\end{array}\qquad\begin{array}{r}638\\793\\136\\483\\+\ 397\\\hline\end{array}\qquad\begin{array}{r}441\\348\\635\\914\\+\ 679\\\hline\end{array}$$

3.

$$\begin{array}{r}272\\107\\814\\760\\591\\467\\157\\+\ 724\\\hline\end{array}\qquad\begin{array}{r}944\\775\\753\\107\\779\\107\\811\\+\ 661\\\hline\end{array}\qquad\begin{array}{r}357\\106\\197\\371\\810\\849\\693\\+\ 556\\\hline\end{array}$$

4.

$$\begin{array}{r}494\\847\\511\\577\\905\\699\\359\\+\ 424\\\hline\end{array}\qquad\begin{array}{r}165\\559\\428\\135\\650\\417\\505\\+\ 876\\\hline\end{array}\qquad\begin{array}{r}618\\622\\159\\285\\341\\375\\662\\+\ 996\\\hline\end{array}$$

Activity 4 - Adding Whole Numbers

(18) Directions: Add and check.

1.	8,027 + 1,932	3,329 + 4,060	6,203 + 2,351
2.	6,001 + 2,573	2,347 + 2,412	7,580 + 1,316
3.	4,825 + 3,054	1,756 + 6,213	6,073 + 2,515
4.	4,815 + 2,114	8,047 + 1,832	1,966 + 4,032
5.	4,116 + 4,572	7,038 + 2,521	2,413 + 4,334
6.	4,261 + 3,428	2,352 + 6,043	7,084 + 2,713

Activity 4 - Adding Whole Numbers

(19) Directions: Add and check.

1.	7,244 + 2,351	8,563 + 1,234	5,042 ÷ 2,635
2.	4,162 + 5,736	2,438 + 4,235	7,654 ÷ 3,476
3.	4,651 + 3,238	3,527 + 1,417	6,355 ÷ 3,846
4.	7,136 + 1,042	3,574 + 3,103	5,546 ÷ 2,342
5.	2,746 + 8,337	8,437 + 5,895	4,825 ÷ 2,164
6.	9,223 + 4,439	7,558 + 6,796	3,251 ÷ 4,748

Activity 4 - Adding Whole Numbers

(20) Directions: Add and check.

1.	2,562 3,114 + 3,201	4,658 3,226 + 1,814	5,673 2,225 + 3,070
2.	4,124 3,251 + 1,524	2,543 6,671 + 1,187	7,338 3,229 + 6,360
3.	8,779 2,286 + 5,269	4,855 2,849 + 1,754	7,630 4,108 + 7,068
4.	8,493 7,601 + 2,519	4,181 7,670 + 2,892	4,596 8,892 + 4,625
5.	9,478 6,791 + 5,912	3,997 9,254 + 4,529	5,504 2,741 + 3,116

Activity 4 - Adding Whole Numbers

(21) Directions: Use scratch paper to add these numbers. Use your calculator to check your answer.

1.

$$\begin{array}{r} 3,948 \\ 7,758 \\ 6,799 \\ +\ 2,437 \\ \hline \end{array} \qquad \begin{array}{r} 6,787 \\ 3,316 \\ 4,213 \\ +\ 5,449 \\ \hline \end{array}$$

2.

$$\begin{array}{r} 8,123 \\ 7,510 \\ 1,085 \\ 6,534 \\ 9,469 \\ 3,638 \\ +\ 1,086 \\ \hline \end{array} \qquad \begin{array}{r} 2,774 \\ 7,887 \\ 3,551 \\ 4,560 \\ 5,494 \\ 1,745 \\ +\ 8,361 \\ \hline \end{array}$$

3.

$$\begin{array}{r} 8,649 \\ 7,856 \\ 4,822 \\ 4,776 \\ 6,252 \\ 2,791 \\ +\ 8,679 \\ \hline \end{array} \qquad \begin{array}{r} 7,099 \\ 9,592 \\ 3,683 \\ 9,971 \\ 1,617 \\ 2,193 \\ +\ 8,062 \\ \hline \end{array}$$

4.

$$\begin{array}{r} 4,108 \\ 7,915 \\ 3,736 \\ +\ 2,615 \\ \hline \end{array} \qquad \begin{array}{r} 9,081 \\ 8,752 \\ 2,978 \\ +\ 7,093 \\ \hline \end{array}$$

Activity 4 - Adding Whole Numbers

(22) Directions: Add and check.

1.	24,207 + 15,072	54,156 + 30,422	32,854 + 43,104
2.	14,871 + 65,118	75,854 + 24,357	40,955 + 46,365
3.	36,745 + 42,031	56,092 + 23,805	72,033 + 21,563
4.	51,084 + 27,505	69,043 + 20,516	23,864 + 51,133
5.	25,401 + 22,367	86,996 + 97,668	27,514 + 22,384

Activity 4 - Adding Whole Numbers

(23) Directions: Add and check.

1.	21,513 + 62,375	63,285 + 24,926	32,643 + 20,898
2.	18,946 + 51,032	70,128 + 16,641	54,223 + 32,564
3.	51,937 + 35,042	69,821 + 20,104	30,649 + 54,320
4.	58,971 + 28,099	72,064 + 27,248	38,684 + 20,314
5.	76,521 + 13,054		

Activity 4 - Adding Whole Numbers

(24) Directions: Add and check.

1.

$$\begin{array}{r} 52{,}364 \\ +\ \ 2{,}305 \\ \hline \end{array} \qquad \begin{array}{r} 35{,}086 \\ +\ \ 1{,}213 \\ \hline \end{array} \qquad \begin{array}{r} 20{,}316 \\ +\ \ 8{,}271 \\ \hline \end{array}$$

2.

$$\begin{array}{r} 86{,}954 \\ 21{,}326 \\ +\ 40{,}579 \\ \hline \end{array} \qquad \begin{array}{r} 29{,}847 \\ 31{,}866 \\ +\ 49{,}230 \\ \hline \end{array} \qquad \begin{array}{r} 59{,}146 \\ 28{,}759 \\ +\ 61{,}238 \\ \hline \end{array}$$

3.

$$\begin{array}{r} 76{,}493 \\ 66{,}590 \\ +\ 27{,}286 \\ \hline \end{array} \qquad \begin{array}{r} 44{,}538 \\ 64{,}908 \\ +\ 70{,}435 \\ \hline \end{array} \qquad \begin{array}{r} 27{,}881 \\ 92{,}855 \\ +\ 33{,}064 \\ \hline \end{array}$$

4.

$$\begin{array}{r} 43{,}972 \\ 61{,}258 \\ +\ 30{,}417 \\ \hline \end{array} \qquad \begin{array}{r} 69{,}836 \\ 71{,}234 \\ +\ 33{,}927 \\ \hline \end{array} \qquad \begin{array}{r} 75{,}634 \\ 32{,}408 \\ +\ 21{,}046 \\ \hline \end{array}$$

5.

$$\begin{array}{r} 27{,}290 \\ +\ \ 2{,}607 \\ \hline \end{array} \qquad \begin{array}{r} 54{,}763 \\ +\ \ 4{,}134 \\ \hline \end{array}$$

Activity 4 - Adding Whole Numbers

(25) Directions: Add and check.

1.
$$\begin{array}{r} 392{,}844 \\ +\ 547{,}276 \\ \hline \end{array} \qquad \begin{array}{r} 693{,}295 \\ +\ 248{,}708 \\ \hline \end{array} \qquad \begin{array}{r} 476{,}698 \\ +\ 781{,}786 \\ \hline \end{array}$$

2.
$$\begin{array}{r} 646{,}245 \\ +\ 695{,}048 \\ \hline \end{array} \qquad \begin{array}{r} 665{,}014 \\ +\ 959{,}084 \\ \hline \end{array} \qquad \begin{array}{r} 236{,}980 \\ +\ 346{,}706 \\ \hline \end{array}$$

3.
$$\begin{array}{r} 683{,}945 \\ +\ 821{,}596 \\ \hline \end{array} \qquad \begin{array}{r} 382{,}769 \\ +\ 737{,}892 \\ \hline \end{array} \qquad \begin{array}{r} 473{,}586 \\ +\ 469{,}218 \\ \hline \end{array}$$

4.
$$\begin{array}{r} 596{,}868 \\ +\ 243{,}117 \\ \hline \end{array} \qquad \begin{array}{r} 998{,}273 \\ +\ 289{,}713 \\ \hline \end{array} \qquad \begin{array}{r} 610{,}199 \\ +\ 583{,}045 \\ \hline \end{array}$$

5.
$$\begin{array}{r} 592{,}768 \\ +\ 409{,}826 \\ \hline \end{array}$$

Activity 4 - Adding Whole Numbers

(26) Directions: Add and check.

1.
$$\begin{array}{r} 642{,}865 \\ +\ 921{,}565 \\ \hline \end{array} \qquad \begin{array}{r} 784{,}228 \\ +\ 843{,}627 \\ \hline \end{array} \qquad \begin{array}{r} 372{,}486 \\ +\ 687{,}769 \\ \hline \end{array}$$

2.
$$\begin{array}{r} 662{,}184 \\ +\ 234{,}013 \\ \hline \end{array} \qquad \begin{array}{r} 729{,}832 \\ +\ 240{,}144 \\ \hline \end{array} \qquad \begin{array}{r} 229{,}056 \\ +\ 500{,}832 \\ \hline \end{array}$$

3.
$$\begin{array}{r} 367{,}455 \\ +\ 422{,}301 \\ \hline \end{array} \qquad \begin{array}{r} 294{,}391 \\ +\ 748{,}692 \\ \hline \end{array} \qquad \begin{array}{r} 249{,}382 \\ +\ 389{,}827 \\ \hline \end{array}$$

4.
$$\begin{array}{r} 831{,}476 \\ +\ 978{,}937 \\ \hline \end{array} \qquad \begin{array}{r} 210{,}976 \\ +\ 384{,}012 \\ \hline \end{array} \qquad \begin{array}{r} 861{,}042 \\ +\ 121{,}446 \\ \hline \end{array}$$

5.
$$\begin{array}{r} 478{,}695 \\ 341{,}217 \\ \hline \end{array}$$

Activity 4 - Adding Whole Numbers

(27) Directions: Use scratch paper to add these numbers. Use your calculator to check your answers.

1. $$\begin{array}{r} 423{,}876{,}982 \\ +\ 839{,}213{,}469 \\ \hline \end{array} \qquad \begin{array}{r} 476{,}827{,}698 \\ +\ 928{,}022{,}809 \\ \hline \end{array} \qquad \begin{array}{r} 247{,}692{,}385 \\ +\ 786{,}427{,}820 \\ \hline \end{array}$$

2. $$\begin{array}{r} 738{,}925{,}467 \\ +\ 426{,}178{,}698 \\ \hline \end{array} \qquad \begin{array}{r} 293{,}847{,}693 \\ +\ 542{,}769{,}827 \\ \hline \end{array} \qquad \begin{array}{r} 786{,}925{,}478 \\ +\ 354{,}769{,}842 \\ \hline \end{array}$$

3. $$\begin{array}{r} 742{,}618{,}726 \\ +\ 427{,}864{,}415 \\ \hline \end{array} \qquad \begin{array}{r} 427{,}893{,}876 \\ +\ 738{,}264{,}699 \\ \hline \end{array} \qquad \begin{array}{r} 924{,}647{,}822 \\ +\ 376{,}256{,}878 \\ \hline \end{array}$$

4. $$\begin{array}{r} 725{,}678{,}296 \\ +\ 854{,}927{,}707 \\ \hline \end{array} \qquad \begin{array}{r} 537{,}698{,}276 \\ +\ 654{,}276{,}987 \\ \hline \end{array} \qquad \begin{array}{r} 547{,}692{,}859 \\ +\ 382{,}769{,}842 \\ \hline \end{array}$$

Activity 5 - Solving Word Problems (Addition)

Objective(s): This activity will enable participants to solve word problems by applying addition skills.

Materials Required:
Pencil

You need to know:

To solve any word problem....

1. Determine what you must find out.

2. Decide what information is necessary in order to solve the problem.

3. Decide what arithmetic operation to use. Since clue words give you the key to solving the problem, pay particular attention to them.

    EXAMPLES:

    in all
    together
    altogether
    total
    both
    combined

    sum
    more
    plus
    and
    added
    increase

    → TO ADD

4. Work out the problem and find the solution.

5. Check your arithmetic. Reread the question to make sure that your answer makes sense.

Activity 5 - Solving Word Problems (continued)

You need to know:

6. Label final answers in order to make the numbers concrete.
EXAMPLES:
Ralph ate 3 boxes of Better Cheddars® last week and 4 boxes this week. How many boxes did he eat altogether?

$$\begin{array}{rll} 3 & \text{boxes} & \searrow \\ +\ 4 & \text{boxes} & \longrightarrow\ \text{LABEL} \\ \hline 7 & \text{boxes} & \nearrow \end{array}$$

Not just 7, but 7 boxes (final answer).

A uniform costs $27.95 and an identification badge costs $20.00. How much did Henry pay for work attire?

$$\begin{array}{r} \$\ 27.95 \\ +\ 20.00 \\ \hline \$\ 47.95 \end{array}$$

$$\begin{array}{c} \nwarrow\ \uparrow \\ \text{LABEL} \end{array}$$

Not just 47.95, but $47.95 (final answer).

Activity 5 - Solving Word Problems (continued)

Directions: Read the word problems below and perform the necessary addition computations to answer the questions that follow.

1. An urban supermarket bought four shipments of Chips Ahoy!® cookies. The first shipment contained 87 cartons, the second 135, the third 111, and the fourth 215. In all, how many cartons were bought? __________

2. Annie, a packing technician, drives to Nabisco from various places and back home each evening. Her records show the following mileage for one week: 58 miles, 45 miles, 62 miles, 31 miles, and 79 miles. What was her total mileage for the week? __________

3. In the Bakery cafeteria, Rob bought a hamburger which costs $1.95, a bag of chips for $.65, and a large grape soda for $.93. How much did his lunch cost? __________

4. Bill and Carol Brown keep a record of the amount of gasoline they use to drive back and forth to Nabisco®. Last month they purchased the following number of gallons: 9, 13, 14, 10, 12, and 14. How many gallons did they purchase during the month? __________

Activity 5 - Solving Word Problems (continued)

5. To reward employees for their outstanding record, Nabisco® management sponsored a luncheon. The following amounts of food were purchased: 110 pounds of hotdogs, 215 pounds of hamburger, 95 pounds of potato salad, 60 pounds of baked beans, and 48 pounds of coleslaw. Altogether, how many pounds of food were purchased? __________

6. During the luncheon, 283 employees were served the first hour, 170 the second hour, 82 the third hour, and 306 the fourth hour. What was the total number of employees served? __________

7. At the Richmond Bakery, the first shift produced 2,000,000 Premium® crackers, the second shift produced 1,743,562, and the third shift produced 1,928,637. How many crackers were produced on this day? __________

8. If 5,000,000 Ritz® crackers can be produced per shift, 2,000,000 Premium® crackers. and 2,400,000 Oreos®, combined how many cookies and crackers can be produced per shift? __________

Activity 5 - Solving Word Problems (continued)

9. Following are the pounds of B&R produced by each production line. What was the total amount of B&R produced for the day? ___________

Line 1:	212	Line 5:	310
Line 2:	178	Line 6:	253
Line 3:	427	Line 7:	404
Line 4:	192		

10. One Thursday, line 1 produced 698 bundles of product, line 2 produced 737 bundles, line 3 produced 834 bundles, and line 4 produced 555 bundles. What was the total number of bundles produced for the day? ___________

11. Following are the number of Nilla Wafer® units rejected by each fill machine on line 5, shift two. How many units were rejected during the shift? ___________

Fill Machine 1:	12	Fill Machine 3:	16
Fill Machine 2:	23	Fill Machine 4:	67

Activity 5 - Solving Word Problems (continued)

12. One Tuesday, three lines produced Wheat Thins®. Line 2 produced 8,983 units, line 5 produced 9,876 units, and line 7 produced 9,495 units. How many units were produced altogether? __________

13. It is 6:17 p.m. and you have to relieve one of the Assemblers in 38 minutes. What time will you arrive to relieve him?

____

14. Ray travels through a tunnel which costs $1.35 each way in order to get to and from work at Nabisco®. How much money does he spend to get through the tunnel daily? __________

15. During a one-hour period, fill machine 1 filled 786 boxes, fill machine 2 filled 993 boxes, and fill machine 3 filled 884 boxes. How many boxes were filled by all three machines? __________

Activity 5 - Solving Word Problems (continued)

16. Over a one-month period, a bakery produced the following number of pounds of B&R: 29,387, 32,740, 26,513 and 30,200. How many pounds of B&R were produced in all during the month? __________.

17. Following are the slug weights for five Chips Ahoy!® slugs (in grams). What is the total weight of the slugs? __________

253.1 246.7 266.5 258.3 260.9

18. On Wednesday, line 1 produced 374 pounds of B&R, line 2 produced 226 pounds, line 3 produced 427 pounds, and line 4 produced 452 pounds. What was the total amount of B&R produced for the day? __________

19. One Monday, shift 1 produced 634 doughs, shift 2 produced 606 doughs, and shift 3 produced 578 doughs. How many doughs were produced for the day? __________

Activity 5 - Solving Word Problems (continued)

20. Calculate the cumulative totals.

Pounds of B&R produced

Shift 1: 643

Shift 2: 376 Cumulative total = __________

Shift 3: 485 Cumulative total = __________

21. Calculate the cumulative totals.

Number of Wheat Thin® units produced by line 1:

Shift 1: 5,432

Shift 2: 4,987 Cumulative total = __________

Shift 3: 5,321 Cumulative total = __________

22. Following are the net weights of five packages of Chips Ahoy!®. What is the total net weight? __________

16.33 16.54 16.70 16.06 16.35

Activity 6 - Subtraction of Whole Numbers

Objective(s): This activity will enable participants to (1) apply the rules for subtracting whole numbers and (2) check the answers to subtraction problems.

Materials Required:
Pencil

You need to know:

1. Subtraction is used everyday in many ways. Whenever you buy an item at the store, your change can be calculated by subtraction. On the job, you may subtract an oil reading from total usage, subtract the lowest bag weight from the highest bag weight to calculate bag weight range, or subtract minor ingredients to put the proper amount of ingredients into the mixer.

2. Subtraction is the opposite of addition. Addition is combining two or more quantities while subtraction is the process of taking one number away from another. It is the process of determining the difference between two numbers or quantities.

3. Use subtraction to figure out how much is left when you remove one number from another or when you want to compare two numbers.

EXAMPLE: (A) Betty had $7.00. She gave $3.50 to Ted for his lunch. How much money did Betty have left?

(A) $$\begin{array}{lr} & \$\,7.00 \\ & -\,3.50 \\ \hline \text{Answer} & \$\,3.50 \end{array}$$

Activity 6 - Subtraction of Whole Numbers (continued)

You need to know: (continued)

EXAMPLE: (B) If a large bag of cookies weighs 18 ounces and a small bag weighs 10 ounces, how much more does the large bag weigh?

$$\begin{array}{lrl} & 18 & \text{ounces} \\ & -\ 10 & \text{ounces} \\ \hline \text{Answer} & 8 & \text{ounces} \end{array}$$

4. The number from which another number is to be subtracted is called the minuend. The number to be subtracted is the subtrahend. The result (answer) is called the difference or remainder.

EXAMPLE:

$$\begin{array}{lrl} & 246 & \text{minuend} \\ & -\ 134 & \text{subtrahend} \\ \hline \text{Answer} & 112 & \text{difference (remainder)} \end{array}$$

Activity 6 - Subtraction of Whole Numbers (continued)

You need to know: (continued)

5. To subtract whole numbers:

EXAMPLE: Subtract 231 from 744.

(A) Write the larger number as the minuend.

(B) Place the digits in the subtrahend in proper columns.

(C) Begin with the units (ones) column and take 1 away from 4. Record the difference (3) in the units column.

(D) Continue in the same manner with the tens and hundreds columns (subtract other columns to the left, where applicable).

(E) The answer (513) is the difference between the two numbers.

	Hundreds	Tens	Ones
Minuend →	7	4	4
Subtrahend →	2	3	1
	5	1	3

Activity 6 - Subtraction of Whole Numbers (continued)

You need to know:

6. If a digit in the subtrahend is too large to take from the digit above it in the minuend, borrow from the next column in the minuend in order to subtract.

   (A) Since you can't subtract 6 from 2, borrow 1 ten from the tens column. (10 + 2 = 12). Place a small 1 next to the 2 in the minuend to show that it is now 12.

   EXAMPLE:

$$\begin{array}{rr} & 6 \\ & \cancel{7}\;{}^{1}2 \\ - & 2\;\;\;6 \\ \hline & 4\;\;\;6 \end{array}$$

   (B) Cross out the 7 in the tens column and make it a six to show that your borrowed 1 ten.

   (C) Subtract: 12 - 6 = 6

   (D) Subtract: 6 - 2 = 4

   (E) The answer (46) is the difference between the two numbers.

Activity 6 - Subtraction of Whole Numbers (continued)

You need to know:

7. If you have to borrow more than once in the same problem, continue the same process with remaining columns. Proceed to subtract by borrowing until you have subtracted each digit

EXAMPLE:

$$\begin{array}{rrrr} & \overset{7}{\cancel{8}} & \overset{15}{\cancel{6}} & {}^{1}4 \\ - & & 8 & 7 \\ \hline & 7 & 7 & 7 \end{array}$$

8. To check a subtraction problem, add the difference (answer) to the subtrahend of the original problem. The sum should be the minuend of the original problem.

EXAMPLE:

$$\begin{array}{rr} & 39 \\ - & 14 \\ \hline & 25 \end{array}$$

(1) 9 - 4 = 5
(2) 3 - 1 = 2

CHECK

$$\begin{array}{rr} & 39\checkmark \\ - & 14 \\ \hline & 25 \\ \hline & 39\checkmark \end{array}$$

(1) 4 + 5 = 9
(2) 1 + 2 = 3

9. For every subtraction problem, there is an equivalent addition problem.

EXAMPLE: 16 - 7 = 9 because 9 + 7 = 16

Activity 6 - Subtraction of Whole Numbers (continued)

Directions: Practice subtracting in your head a one digit number from a larger number. Have a classmate time you for exactly 5 minutes as you work to accurately complete the chart. Subtract the numbers in the left column from each of the numbers across the top of the chart. GO AS FAST AS YOU CAN!

—	16	23	30	18	90	12	47	10	25
9									
7									
5									
3									
8									
6									
4									

Activity 6 - Subtracting Whole Numbers

(1) Directions: Subtract.

1.	8	7	4	9	8	3	1	8	5	6
—	- 4	- 0	- 2	- 0	- 7	- 2	- 1	- 5	- 2	- 6

2.	6	5	7	4	9	8	2	6	7	9
	- 3	- 4	- 7	- 3	- 2	- 5	- 0	- 2	- 6	- 6

3.	4	8	13	9	6	12	3	15	11	4
	- 0	- 2	- 8	- 1	- 6	- 3	- 1	- 7	- 5	- 1

Activity 6 - Subtracting Whole Numbers

(2) Directions: Subtract.

1.	10	5	18	8	6	15	9	16	5	12
—	- 5	- 1	- 9	- 2	- 6	- 7	- 7	- 9	- 5	- 4

2.	5	7	8	13	11	7	8	11	10	9
	- 3	- 6	- 3	- 5	- 3	- 2	- 0	- 9	- 7	- 9

3.	13	12	11	2	7	13	6	6	9	13
	- 8	- 3	- 5	- 2	- 0	- 9	- 5	- 1	- 0	- 6

Activity 6 - Subtracting Whole Numbers

(3) Directions: Subtract.

1.	16	8	10	5	6	5	7	14	18	11
	- 7	- 6	- 5	- 4	- 2	- 1	- 3	- 8	- 9	- 4

2.	12	10	12	14	7	10	16	5	7	11
	- 5	- 3	- 8	- 9	- 5	- 4	- 7	- 4	- 3	- 4

3.	7	5	13	14	3	4	15	10	9	2
	- 1	- 2	- 7	- 6	- 2	- 3	- 6	- 9	- 3	- 1

Activity 6 - Subtracting Whole Numbers

(4) Directions: Subtract.

1.	13	4	9	5	8	3	1	8	11	12
—	- 7	- 3	- 3	- 0	- 5	- 3	- 1	- 7	- 6	- 7

2.	9	12	10	7	11	11	7	14	15	2
	- 8	- 9	- 8	- 6	- 3	- 9	- 1	- 6	- 6	- 1

3.	10	14	12	6	7	11	9	10	1	8
	- 1	- 9	- 6	- 0	- 5	- 7	- 5	- 4	- 0	- 1

Cluster
Applied Math

Activity 6 - Subtracting Whole Numbers

(5) Directions: Subtract.

1.	14	11	2	17	16	4	5	13	8	9
—	- 7	- 2	- 0	- 9	- 8	- 2	- 3	- 5	- 0	- 9

2.	6	5	10	13	8	17	7	3	15	11
	- 4	- 0	- 2	- 4	- 5	- 8	- 4	- 3	- 9	- 8

3.	6	15	4	3	9	7	10	6	9	8
	- 3	- 8	- 4	- 0	- 4	- 7	- 1	- 0	- 5	- 1

Activity 6 - Subtracting Whole Numbers

(6) Directions: Subtract.

1.	1	14	6	8	9	15	11	10	4	12
—	- 1	- 5	- 3	- 7	- 6	- 8	- 6	- 6	- 4	- 7

2.	12	11	1	8	6	14	4	9	3	4
	- 6	- 7	- 0	- 6	- 2	- 8	- 0	- 1	- 1	- 1

3.	8	7	10	5	3	10	6	13	7	11
	- 3	- 2	- 7	- 2	- 2	- 9	- 4	- 4	- 4	- 8

Activity 6 - Subtracting Whole Numbers

(7) Directions: Subtract.

1.	6	17	9	6	16	12	9	4	10	13
—	- 5	- 9	- 8	- 1	- 8	- 9	- 0	- 2	- 8	- 6
2.	10	17	15	14	9	10	9	8	13	8
	- 2	- 8	- 9	- 5	- 6	- 6	- 2	- 8	- 6	- 4
3.	9	2	14	16	7	11	5	13	2	12
	- 7	- 2	- 7	- 9	- 0	- 2	- 5	- 9	- 0	- 4

Activity 6 - Subtracting Whole Numbers

(8) Directions: Subtract and check.

1.

$$\begin{array}{rrrrr} 60 & 35 & 77 & 74 & 58 \\ -\,40 & -\,21 & -\,73 & -\,40 & -\,32 \\ \hline \end{array}$$

2.

$$\begin{array}{rrrrr} 63 & 72 & 85 & 96 & 43 \\ -\,22 & -\,70 & -\,34 & -\,62 & -\,43 \\ \hline \end{array}$$

3.

$$\begin{array}{rrrrr} 91 & 62 & 33 & 52 & 45 \\ -\,6 & -\,9 & -\,4 & -\,27 & -\,16 \\ \hline \end{array}$$

Activity 6 - Subtracting Whole Numbers

(9) Directions: Subtract and check.

1.

$$\begin{array}{rrrrr} 57 & 43 & 65 & 82 & 60 \\ \underline{-\ 18} & \underline{-\ 25} & \underline{-\ \ 8} & \underline{-\ 75} & \underline{-\ 42} \end{array}$$

2.

$$\begin{array}{rrrrr} 36 & 48 & 51 & 25 & 74 \\ \underline{-\ 18} & \underline{-\ 29} & \underline{-\ 36} & \underline{-\ 18} & \underline{-\ 27} \end{array}$$

3.

$$\begin{array}{rrrrr} 34 & 69 & 38 & 52 & 75 \\ \underline{-\ 22} & \underline{-\ 35} & \underline{-\ 31} & \underline{-\ 32} & \underline{-\ 51} \end{array}$$

Activity 6 - Subtracting Whole Numbers

(10) Directions: Subtract and check.

1.	82	27	21	95	63
	- 9	- 8	- 7	- 8	- 5
2.	54	28	94	77	58
	- 33	- 14	- 51	- 36	- 48
3.	83	95	50	68	97
	- 25	- 39	- 28	- 49	- 58

Activity 6 - Subtracting Whole Numbers

(11) Directions: Subtract and check.

1. $\begin{array}{r} 78 \\ -\,15 \\ \hline \end{array}$ $\quad$ $\begin{array}{r} 28 \\ -\,10 \\ \hline \end{array}$ $\quad$ $\begin{array}{r} 56 \\ -\,12 \\ \hline \end{array}$ $\quad$ $\begin{array}{r} 67 \\ -\,25 \\ \hline \end{array}$ $\quad$ $\begin{array}{r} 79 \\ -\,54 \\ \hline \end{array}$

2. $\begin{array}{r} 67 \\ -\,8 \\ \hline \end{array}$ $\quad$ $\begin{array}{r} 95 \\ -\,9 \\ \hline \end{array}$ $\quad$ $\begin{array}{r} 48 \\ -\,9 \\ \hline \end{array}$ $\quad$ $\begin{array}{r} 68 \\ -\,9 \\ \hline \end{array}$ $\quad$ $\begin{array}{r} 84 \\ -\,7 \\ \hline \end{array}$

3. $\begin{array}{r} 76 \\ -\,7 \\ \hline \end{array}$ $\quad$ $\begin{array}{r} 47 \\ -\,8 \\ \hline \end{array}$ $\quad$ $\begin{array}{r} 94 \\ -\,8 \\ \hline \end{array}$ $\quad$ $\begin{array}{r} 81 \\ -\,40 \\ \hline \end{array}$ $\quad$ $\begin{array}{r} 62 \\ -\,11 \\ \hline \end{array}$

Activity 6 - Subtracting Whole Numbers

(12) Directions: Subtract and check.

1.	85	44	68	70	42
	- 16	- 27	- 59	- 32	- 18
2.	76	21	65	87	48
	- 71	- 11	- 53	- 62	- 17
3.	53	28	97	79	64
	- 36	- 19	- 28	- 58	- 26

Activity 6 - Subtracting Whole Numbers

(13) Directions: Subtract and check.

1.	75	71	38	24	92
—	- 17	- 26	- 19	- 11	- 39
2.	57	61	92	41	37
	- 29	- 34	- 83	- 21	- 15
3.	62	46	58	61	92
	- 21	- 25	- 26	- 47	- 29

Activity 6 - Subtracting Whole Numbers

(14) Directions: Subtract and check.

1.	300	400	600	200	900
—	- 37	- 45	- 63	- 34	- 51
2.	553	417	864	241	752
	- 69	- 58	- 87	- 48	- 57
3.	251	742	927	381	793
	- 38	- 27	- 18	- 53	- 86

Activity 6 - Subtracting Whole Numbers

(15) Directions: Subtract and check.

1.	896 - 88	692 - 85	546 - 37	695 - 88	588 - 79
2.	205 - 86	306 - 38	402 - 46	508 - 59	206 - 49
3.	795 - 29	932 - 38	866 - 47	357 - 28	614 - 17

Activity 6 - Subtracting Whole Numbers

(16) Directions: Subtract and check.

1.	602	501	803	902	401
	- 58	- 29	- 37	- 44	- 53
2.	968	141	572	543	519
	- 74	- 80	- 91	- 62	- 53
3.	640	365	482	981	288
	- 27	- 48	- 75	- 63	- 59

Activity 6 - Subtracting Whole Numbers

(17) Directions: Subtract and check.

1.

$$\begin{array}{r} 334 \\ -\ \underline{299} \end{array} \qquad \begin{array}{r} 634 \\ -\ \underline{467} \end{array} \qquad \begin{array}{r} 310 \\ -\ \underline{123} \end{array}$$

2.

$$\begin{array}{r} 246 \\ -\ \underline{134} \end{array} \qquad \begin{array}{r} 983 \\ -\ \underline{672} \end{array} \qquad \begin{array}{r} 643 \\ -\ \underline{482} \end{array}$$

3.

$$\begin{array}{r} 401 \\ -\ \underline{389} \end{array} \qquad \begin{array}{r} 893 \\ -\ \underline{748} \end{array} \qquad \begin{array}{r} 472 \\ -\ \underline{472} \end{array}$$

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Applied Math

Activity 6 - Subtracting Whole Numbers

(18) Directions: Subtract and check.

1. $\begin{array}{r} 641 \\ -\ \underline{500} \end{array}$ $\qquad$ $\begin{array}{r} 812 \\ -\ \underline{602} \end{array}$ $\qquad$ $\begin{array}{r} 559 \\ -\ \underline{247} \end{array}$

2. $\begin{array}{r} 885 \\ -\ \underline{452} \end{array}$ $\qquad$ $\begin{array}{r} 740 \\ -\ \underline{520} \end{array}$ $\qquad$ $\begin{array}{r} 482 \\ -\ \underline{331} \end{array}$

3. $\begin{array}{r} 562 \\ -\ \underline{491} \end{array}$ $\qquad$ $\begin{array}{r} 496 \\ -\ \underline{263} \end{array}$ $\qquad$ $\begin{array}{r} 842 \\ -\ \underline{761} \end{array}$

Activity 6 - Subtracting Whole Numbers

(19) Directions: Subtract and check.

1.	525 - 247	287 - 198	216 - 158
2.	305 - 278	207 - 199	401 - 285
3.	466 - 388	373 - 199	983 - 585

Activity 6 - Subtracting Whole Numbers

(20) Directions: Subtract and check.

1. $\begin{array}{r}502\\-\ \underline{263}\end{array}$ $\quad$ $\begin{array}{r}308\\-\ \underline{149}\end{array}$ $\quad$ $\begin{array}{r}604\\-\ \underline{326}\end{array}$

2. $\begin{array}{r}418\\-\ \underline{279}\end{array}$ $\quad$ $\begin{array}{r}957\\-\ \underline{821}\end{array}$ $\quad$ $\begin{array}{r}627\\-\ \underline{468}\end{array}$

3. $\begin{array}{r}650\\-\ \underline{440}\end{array}$ $\quad$ $\begin{array}{r}848\\-\ \underline{232}\end{array}$ $\quad$ $\begin{array}{r}567\\-\ \underline{356}\end{array}$

Activity 6 - Subtracting Whole Numbers

(21) Directions: Subtract and check.

1.
$$\begin{array}{r} 467 \\ -\ 349 \\ \hline \end{array} \qquad \begin{array}{r} 355 \\ -\ 237 \\ \hline \end{array} \qquad \begin{array}{r} 653 \\ -\ 409 \\ \hline \end{array}$$

2.
$$\begin{array}{r} 983 \\ -\ 147 \\ \hline \end{array} \qquad \begin{array}{r} 578 \\ -\ 429 \\ \hline \end{array} \qquad \begin{array}{r} 356 \\ -\ 180 \\ \hline \end{array}$$

3.
$$\begin{array}{r} 942 \\ -\ 611 \\ \hline \end{array} \qquad \begin{array}{r} 889 \\ -\ 278 \\ \hline \end{array} \qquad \begin{array}{r} 468 \\ -\ 432 \\ \hline \end{array}$$

Activity 6 - Subtracting Whole Numbers

(22) Directions: Subtract and check.

1. $$\begin{array}{r} 893 \\ -\ \underline{655} \end{array} \qquad \begin{array}{r} 972 \\ -\ \underline{408} \end{array} \qquad \begin{array}{r} 331 \\ -\ \underline{125} \end{array}$$

2. $$\begin{array}{r} 362 \\ -\ \underline{188} \end{array} \qquad \begin{array}{r} 721 \\ -\ \underline{356} \end{array} \qquad \begin{array}{r} 982 \\ -\ \underline{581} \end{array}$$

3. $$\begin{array}{r} 371 \\ -\ \underline{269} \end{array} \qquad \begin{array}{r} 684 \\ -\ \underline{547} \end{array} \qquad \begin{array}{r} 143 \\ -\ \underline{128} \end{array}$$

Activity 6 - Subtracting Whole Numbers

(23) Directions: Subtract and check.

1. $\begin{array}{r} 974 \\ -\ 923 \\ \hline \end{array}$ $\qquad$ $\begin{array}{r} 567 \\ -\ 524 \\ \hline \end{array}$ $\qquad$ $\begin{array}{r} 534 \\ -\ 311 \\ \hline \end{array}$

2. $\begin{array}{r} 337 \\ -\ 155 \\ \hline \end{array}$ $\qquad$ $\begin{array}{r} 812 \\ -\ 90 \\ \hline \end{array}$ $\qquad$ $\begin{array}{r} 764 \\ -\ 581 \\ \hline \end{array}$

3. $\begin{array}{r} 952 \\ -\ 940 \\ \hline \end{array}$ $\qquad$ $\begin{array}{r} 540 \\ -\ 230 \\ \hline \end{array}$ $\qquad$ $\begin{array}{r} 686 \\ -\ 251 \\ \hline \end{array}$

Activity 6 - Subtracting Whole Numbers

(24) Directions: Subtract and check.

1. $$\begin{array}{rrr} 794 & \qquad 652 & \qquad 498 \\ -\underline{478} & \qquad -\underline{239} & \qquad -\underline{379} \end{array}$$

2. $$\begin{array}{rrr} 563 & \qquad 777 & \qquad 835 \\ -\underline{185} & \qquad -\underline{298} & \qquad -\underline{348} \end{array}$$

3. $$\begin{array}{rrr} 364 & \qquad 751 & \qquad 523 \\ -\underline{263} & \qquad -\underline{401} & \qquad -\underline{321} \end{array}$$

Activity 6 - Subtracting Whole Numbers

(25) Directions: Subtract and check.

1. — $\begin{array}{r} 458 \\ -\ \underline{349} \end{array}$ $\qquad$ $\begin{array}{r} 691 \\ -\ \underline{227} \end{array}$ $\qquad$ $\begin{array}{r} 854 \\ -\ \underline{536} \end{array}$

2. $\begin{array}{r} 278 \\ -\ \underline{119} \end{array}$ $\qquad$ $\begin{array}{r} 445 \\ -\ \underline{108} \end{array}$ $\qquad$ $\begin{array}{r} 764 \\ -\ \underline{545} \end{array}$

3. $\begin{array}{r} 249 \\ -\ \underline{134} \end{array}$ $\qquad$ $\begin{array}{r} 553 \\ -\ \underline{243} \end{array}$ $\qquad$ $\begin{array}{r} 916 \\ -\ \underline{503} \end{array}$

Activity 6 - Subtracting Whole Numbers

(26) Directions: Subtract and check.

1. $\begin{array}{r} 683 \\ - \underline{421} \end{array}$ $\quad$ $\begin{array}{r} 944 \\ - \underline{703} \end{array}$ $\quad$ $\begin{array}{r} 871 \\ - \underline{260} \end{array}$

2. $\begin{array}{r} 772 \\ - \underline{341} \end{array}$ $\quad$ $\begin{array}{r} 908 \\ - \underline{305} \end{array}$ $\quad$ $\begin{array}{r} 197 \\ - \underline{122} \end{array}$

3. $\begin{array}{r} 887 \\ - \underline{352} \end{array}$ $\quad$ $\begin{array}{r} 543 \\ - \underline{243} \end{array}$ $\quad$ $\begin{array}{r} 781 \\ - \underline{300} \end{array}$

Activity 6 - Subtracting Whole Numbers

(27) Directions: Subtract and check.

1.	692 - 491	485 - 324	727 - 512
2.	739 - 628	609 - 203	957 - 342
3.	266 - 118	385 - 166	597 - 408

Activity 6 - Subtracting Whole Numbers

(28) Directions: Subtract and check.

1.	800	300	500
	- 263	- 127	- 233
2.	400	600	200
	- 291	- 382	- 194
3.	700	900	300
	- 266	- 724	- 123

Activity 6 - Subtracting Whole Numbers

(29) Directions: Subtract and check.

1.	5,037 - 329	1,201 - 642	5,834 - 855
2.	3,633 - 794	4,125 - 636	2,961 - 972
3.	1,896 - 484	1,896 - 494	1,896 - 498

Activity 6 - Subtracting Whole Numbers

(30) Directions: Subtract and check.

1. $\begin{array}{r} 1{,}876 \\ -\quad 689 \\ \hline \end{array} \qquad \begin{array}{r} 3{,}243 \\ -\quad 892 \\ \hline \end{array} \qquad \begin{array}{r} 3{,}243 \\ -\quad 856 \\ \hline \end{array}$

2. $\begin{array}{r} 5{,}648 \\ -\quad 649 \\ \hline \end{array} \qquad \begin{array}{r} 6{,}345 \\ -\quad 258 \\ \hline \end{array} \qquad \begin{array}{r} 1{,}827 \\ -\quad 918 \\ \hline \end{array}$

3. $\begin{array}{r} 8{,}002 \\ -\quad 628 \\ \hline \end{array} \qquad \begin{array}{r} 9{,}003 \\ -\quad 324 \\ \hline \end{array} \qquad \begin{array}{r} 4{,}005 \\ -\quad 556 \\ \hline \end{array}$

Activity 6 - Subtracting Whole Numbers

(31) Directions: Subtract and check.

1.

4,080	3,070	5,020
- 387	- 991	- 438

2.

1,896	1,004	4,468
- 499	- 687	- 579

3.

3,006	8,007	1,006
- 439	- 299	- 307

Activity 6 - Subtracting Whole Numbers

(32) Directions: Subtract and check.

1. $\begin{array}{r} 2{,}040 \\ -\quad 462 \\ \hline \end{array}$ $\qquad$ $\begin{array}{r} 3{,}060 \\ -\quad 392 \\ \hline \end{array}$ $\qquad$ $\begin{array}{r} 1{,}050 \\ -\quad 465 \\ \hline \end{array}$

2. $\begin{array}{r} 4{,}003 \\ -\quad 621 \\ \hline \end{array}$ $\qquad$ $\begin{array}{r} 9{,}002 \\ -\quad 972 \\ \hline \end{array}$ $\qquad$ $\begin{array}{r} 6{,}001 \\ -\quad 430 \\ \hline \end{array}$

3. $\begin{array}{r} 7{,}263 \\ -\quad 185 \\ \hline \end{array}$ $\qquad$ $\begin{array}{r} 4{,}775 \\ -\quad 683 \\ \hline \end{array}$ $\qquad$ $\begin{array}{r} 5{,}176 \\ -\quad 438 \\ \hline \end{array}$

Activity 6 - Subtracting Whole Numbers

(33) Directions: Subtract and check.

1.	8,240	2,334	1,615
	- 327	- 516	- 807
2.	3,004	5,006	2,007
	- 973	- 425	- 347

Activity 7 - Calculating the Range of Whole Numbers

Objective(s): This activity will enable participants to find the range between two numbers.

Materials Required:
Pencil
Scratch Paper

You need to know:

1. Subtraction is used to calculate the range between two numbers.

2. The range is the difference between the lowest number and the highest number calculated when taking measurements such as temperatures, weights, etc.

EXAMPLE:

Find the range of these dough weights:

106 g   101 g   110 g   103 g

A. Arrange the measurements (temperatures, weights, etc.) in sequence:

110 g
106 g
103 g
101 g

B. Determine the largest measurement. → 110 g

C. Determine the smallest measurement. → 101 g

Activity 7 - Calculating the Range of Whole Numbers (continued)

You need to know:

D. Subtract the smallest measurement from the largest measurement.

$$\begin{array}{r l} 110 & \text{g} \\ -\underline{101} & \text{g} \\ 9 & \text{g} \quad \text{(range)} \end{array}$$

E. The difference is the range.

3. The simplest way to report variations is to give the range between the highest and lowest measurement. You can interpret the variation in a process by examining the patterns on control charts. Such patterns let you know if the process is operating according to guidelines or if it is not in control.

4. For example, you can check wet weights, dough weights, or oven temperatures by calculating the range between measurements.

Activity 7 - Calculating the Range of Whole Numbers (continued)

Directions: Underline the largest and the smallest number in each row below. Calculate the range of each row of numbers and write your answer in the blank.

					Range
A)	18	12	14	16	
B)	21	27	23	25	
C)	6	2	8	4	
D)	9	7	5	3	
E)	44	48	42	40	
F)	33	35	32	36	
G)	51	50	53	57	
H)	17	11	6	3	
I)	33	13	22	11	
J)	213	266	245	202	

Activity 7 - Calculating the Range of Whole Numbers (continued)

Directions: Calculate the range.

1. Find the range of the following oil readings:

4 % 11 % 10 % 8 % 13 %

Range: %

2. Find the range of the following bag weights:

18 oz. 17 oz. 14 oz. 12 oz. 10 oz.

Range: oz.

3. Calculate the range of the following wet weights:

A) 74 69 67 Range:

B) 76 72 67 Range:

C) 69 72 68 Range:

D) 70 74 66 Range:

E) 76 75 65 Range:

4. Find the range of these oven temperatures:

A) 410° 580° 550° 520° 415° 330° 420° 450°

Range: °

B) 350° 500° 510° 400° 340° 360° 300° 320°

Range: °

Activity 8 - Calculating Tare Weights

Objective(s): This activity will enable participants to determine product weights.

Materials Required:
Pencil
Scratch Paper

You need to know:

1. To figure out precisely how much product or ingredient is on a scale, you must first subtract the weight of the packaging material or container holding the product or ingredient. This packaging material or container is known as the tare.

2. If a bag of Oreos® is labeled 20 ounces, this means 20 ounces of edible product, not including the bag (tare weight). To determine how much edible product is in the bag, first weigh the empty bag and then subtract this weight from the weight of the full bag. The remainder (difference) is the actual amount of edible product inside the bag. When you press the Tare Key on the scale, the scale makes this calculation for you.

   EXAMPLE: Find the following product weight:

   16 oz. of cookies including the bag
   - 2 oz. of packaging material (tare)
   14 oz. exact weight of cookies inside the bag

Activity 9 - Subtracting Whole Numbers (Word Problems)

Directions: Use subtraction to solve the following problems:

1. Suppose lines 8 and 9 in a bakery produce Snackwells®. The total number of units produced daily is 32,988. Line 9 produces 18,752 units per day. How many units are produced by Line 8?

   ____

2. The total package weight of a box of Cheese Nips® is 383 grams. The tare weight is 73 grams. What is the net weight?

   ____

3. The total package weight of a package of Chips Ahoy!® is 18 ounces. The packaging tare is 2 ounces. What is the net weight?

   ____

4. The total package weight of a box of Premium® crackers is 17 ounces. The tare weight is 1 ounce. What is the actual product weight?

   ____

5. One Thursday, shift 2 produced 634 doughs and shift 3 produced 527 doughs. How many more doughs did shift 2 produce than shift 3?

   ____

6. On Wednesday, shift 1 produced 694 pounds of B&R and shift 2 produced 447 pounds of B&R. How much more B&R was produced by shift 1 than by shift 2?

   ____

Activity 9 - Subtracting Whole Numbers (Word Problems) (continued)

7. On Friday, three shifts produced Oreos®. Shift 3 produced 9,298 units, shift 1 produced 9,986 units, and shift 2 produced 8,897 units.

   A) How many more units did shift 1 produce than shift 3?

   ____

   B) How many more units did shift 1 produce than shift 2?

   ____

   C) How many more units did shift 3 produce than shift 2?

   ____

8. Find the following product weights:

   A) 178g of product; 10g of packaging material

   product weight: ________

   B) 249g of product; 13g of packaging material

   product weight: ________

   C) 254g of product; 12g of packaging material

   product weight: ________

   D) 12 oz. of product; 2 oz. of packaging material

   product weight: ________

   E) 22 oz. of product; 4 oz. of packaging material

   product weight: ________

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Activity 10 - Decimal Place Values/Reading and Writing Decimals

Objective(s): This activity will enable participants to identify decimal place values and to read and write decimals.

Materials Required:
Pencil

You need to know:

1. A decimal is a number which stands for a part of a whole. It is written with a decimal point (.) followed by digits to the right. Each digit to the right of the decimal point stands for less than a whole number.

2. Like whole numbers, the placement of each digit in a decimal number, or its place value, determines the value of the decimal.

3. The decimal point (.) separates the whole number places from the decimal places. Moving to the left of the decimal point, place values increase. Moving to the right of the decimal point, place values decrease.

4. Decimals may be read in two different ways:
    (a) Place Value - Read the value of the entire number and read the decimal point as "and." Use the place value of the last digit in reading the decimal. For example, .4 is read "four tenths"; .04 is read "four hundredths"; .004 is read "four thousandths"; .0004 is read "four ten-thousandths"; and 1.45 is read "one and forty five hundredths".

Activity 10 - Decimal Place Values/Reading and Writing Decimals (continued)

You need to know:

Hundreds	Tens	Ones	Decimal Point	Tenths	Hundredths	Thousandths	Ten Thousandths	Hundred Thousandths	Millionths
			.	4					
			.	0	4				
			.	0	0	4			
			.	0	0	0	4		
		1	.	4	5				

(b) Point Value - Read each digit, reading the decimal point as "point." For example, 1.45 is read "one point four five."

EXAMPLES:

.9 = nine tenths, or point nine

.015 = fifteen thousandths, or point zero one five

12.43 = twelve and forty-three hundredths, or twelve point four three

118.257 = one hundred eighteen and two hundred fifty-seven thousandths, or one hundred eighteen point two five seven

Activity 10 - Decimal Place Values/Reading and Writing Decimals (continued)

Directions: Before starting this exercise, read aloud to the instructor the decimals listed below. Write the place name of the last digit in each decimal in the blank provided. Underline all the digits that represent less than a whole.

(1) 29.3 ____________________

(2) 679.23 ____________________

(3) 51.084 ____________________

(4) 392.19 ____________________

(5) 500.453 ____________________

(6) 14.7 ____________________

(7) 38.22 ____________________

(8) 142.002 ____________________

(9) 25.6341 ____________________

(10) 12.36 ____________________

Activity 10 - Decimal Place Values/Reading and Writing Decimals (continued)

Directions: Rewrite the numbers below as decimals. When you've completed the exercise, read the decimals aloud to the instructor.

(1) twenty-seven and eight tenths ________

(2) forty-five and sixty-three hundredths ________

(3) nineteen and two hundred forty-two thousandths ________

(4) twenty-five and thirty-four ten thousandths ________

(5) fifty and thirty-three thousandths ________

(6) eighty-one hundredths ________

(7) three and five tenths ________

(8) one hundred thirty-seven thousandths ________

(9) twelve and fifteen thousand six hundred twenty-five hundred-thousandths ________

(10) eight hundred seventy-five ten-thousandths ________

Activity 10 - Decimal Place Values/Reading and Writing Decimals

Directions: Write the following decimals in words.

(1) .8 ____________________

(2) .09 ____________________

(3) .378 ____________________

(4) 10.475 ____________________

(5) .0028 ____________________

(6) 8.000326 ____________________

(7) 19.55 ____________________

(8) .0041 ____________________

(9) .000208 ____________________

(10) 16.013 ____________________

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Activity 11 - Adding Decimals

Objective(s): This activity will enable participants to add decimals.

Materials Required:
Pencil
Scratch Paper

You need to know:

1. A decimal is a number which stands for a part of a whole. It is written with a decimal point (.) followed by digits to the right. Each digit to the right of the decimal point stands for less than a whole number. The decimal point is also used to separate whole numbers from decimals.

2. Decimals are special types of fractions which are used daily. They are often referred to as decimal fractions.
   A) Any fraction with a denominator of 10 or a multiple of 10 can be written as a decimal.

      EXAMPLES:

$$\frac{3}{10} = .3, \quad \frac{175}{1000} = .175, \quad \frac{15}{100} = .15$$

   B) Decimal fractions are used every day.

      EXAMPLES:

money system (dollars and cents)	$ 5.95
gallons of gasoline	12.8 gallons
timing of sports events	9.5 seconds
car mileage	7.2 miles

Activity 11 - Adding Decimals (continued)

You need to know:

3. Decimal measurements are used in recording net weights, product moisture, slug weights, product pH, etc. Suppose you were asked to find the total slug weight of six Premium® slugs. Since cracker slugs may be measured in decimal form, you would need to know how to add decimals.

4. Adding decimals is very similar to adding whole numbers. In fact, the only difference between adding whole numbers and adding decimals is the placement of the decimal point.

EXAMPLE: Add .2 + 6.07 + 1.943 + .005

A) Write the numbers under each other so that all the decimal points are aligned vertically.

$$\begin{array}{r@{}l} & .2 \\ 6 & .07 \\ 1 & .943 \\ \underline{} & \underline{.005} \end{array}$$

Zeros may be added to the numbers so that they all have an equal number of places after the decimal point. Adding zeros will not change the value of the numbers. Besides, you may follow this practice to avoid errors in addition.

$$\begin{array}{r@{}l} & .2000 \\ 6 & .0700 \\ 1 & .9430 \\ \underline{} & \underline{.0050} \end{array}$$

Activity 11 - Adding Decimals (continued)

You need to know:

B) Add each column with the same place value, starting with the column farthest to the right.

If a sum is greater than 9, carry to the column immediately to the left.

```
   .2000
  6.0700
  1.9430
   .0050
 -------
  82180
```

C) Write the decimal point in the answer so that it lines up with the decimal points in the problem.

```
   .2000
  6.0700
  1.9430
   .0050
 -------
  8.2180  Answer
```

Activity 11 - Adding Decimals (continued)

Directions: Add.

1. $$\begin{array}{r} .6 \\ .5 \\ .1 \\ \hline \end{array} \qquad \begin{array}{r} .3 \\ .2 \\ .4 \\ \hline \end{array} \qquad \begin{array}{r} .9 \\ .7 \\ .8 \\ \hline \end{array} \qquad \begin{array}{r} .1 \\ .4 \\ .7 \\ \hline \end{array}$$

2. $$\begin{array}{r} .2 \\ .4 \\ .6 \\ \hline \end{array} \qquad \begin{array}{r} .3 \\ .5 \\ .7 \\ \hline \end{array} \qquad \begin{array}{r} .4 \\ .6 \\ .8 \\ \hline \end{array} \qquad \begin{array}{r} .5 \\ .7 \\ .9 \\ \hline \end{array}$$

3. $$\begin{array}{r} .10 \\ .15 \\ .20 \\ \hline \end{array} \qquad \begin{array}{r} .12 \\ .14 \\ .16 \\ \hline \end{array} \qquad \begin{array}{r} .19 \\ .17 \\ .14 \\ \hline \end{array} \qquad \begin{array}{r} .13 \\ .16 \\ .18 \\ \hline \end{array}$$

4. $$\begin{array}{r} .11 \\ .32 \\ .54 \\ \hline \end{array} \qquad \begin{array}{r} .15 \\ .28 \\ .45 \\ \hline \end{array} \qquad \begin{array}{r} .22 \\ .73 \\ .47 \\ \hline \end{array} \qquad \begin{array}{r} .19 \\ .37 \\ .51 \\ \hline \end{array}$$

Activity 11 - Adding Decimals (continued)

Directions: Add.

1.	.4 .7 8.7	.9 .5 4.3	.1 .6 3.2	.8 .4 6.5
2.	9.3 17.7 74.2	2.3 18.6 62.7	4.8 16.4 88.5	7.6 15.2 53.9
3.	76.8 119.42 24.4	32.5 321.26 29.3	67.9 392.28 21.8	35.7 231.09 10.6
4.	3.8 2.1	5.7 3.2	4.5 1.3	3.2 2.5

Activity 11 - Adding Decimals (continued)

Directions: Add.

1.	9.3 1.4	2.6 5.3	2.9 8.4	8.3 9.9
2.	3.02 8.3	7.29 5.0	6.55 4.3	4.69 6.4
3.	.41 2.89	.57 4.18	.23 7.08	.64 3.77
4.	.32 9.46	.13 2.06	.47 5.32	.16 4.82

Activity 11 - Adding Decimals (continued)

Directions: Add.

1.	6.6 .81 .056	2.1 .49 .043	8.9 .67 .039	9.2 .10 .500
2.	60.3 2.85 5.77	.870 1.54 725.073	194.7 84.02 9.006	6.57 29.35 1.7
3.	14.6 .73 7.18	24.3 .10 25.67	8.80 7.7 52.3	.223 20.9 57.46
4.	.817 6.465 3.73	62.1 8.97 .973	.526 6.83 3.4	62.1 8.97 .9730

Activity 11 - Adding Decimals (continued)

Directions: Calculate the following sums.

1. 5,342.1 + 367.22 = ______________

2. 29 + 32.43 + 236.211 + 10.32 = ____________

3. Following are net weights for 18-ounce packages of Chips Ahoy!® What is the total net weight for these six packages?

   Answer: _______________ounces

   17.9 18.2 18.4 18.7 18.5 18.8

4. Following are the net weights for 13.5-ounce boxes of Cheese Nips®. What is the total net weight for these 4 boxes?

   Answer: ____________ounces

   13.383 13.501 13.496 13.023

5. Following are the slug weights for six Chips Ahoy!® slugs. What is the total weight of the slugs?

   Answer: ____________grams

   255.3 249.1 254.6 264.4 257.8 261.7

Activity 12 - Rounding Decimals

Objective(s): This activity will enable participants to round decimals to the nearest tenth, hundredth, and thousandth place.

Materials Required:
Pencil

You need to know:

1. Decimals are often rounded off, especially when working with measurements. In fact, the steps for rounding off decimals are the same as those used for rounding off whole numbers.

2. HOW TO ROUND DECIMALS
   - A) Identify the digit just to the right of the place to which you are rounding.
   - B) If this digit is less than 5, drop it (and all the digits to its right, if applicable).
   - C) If the digit is 5 or more, add 1 to the digit in the place to which you are rounding.

3. EXAMPLE:

Suppose you were asked to round the net weight of a carton of Premiums® to the nearest tenth (16.65 ounces).

The digit just to the right of the place to which you are rounding is 5 (16.65 ounces).

If this digit is less than 5 (16.64 ounces), drop it (and all the digits to its right, if applicable).
$16.6\cancel{4}$ = 16.6 ounces (answer)

Since this digit is at least 5 (or more), add 1 to the digit in the place to which you are rounding.
16.65 ounces = 16.7 ounces (answer)

Activity 12 - Rounding Decimals

Directions: Round the numbers as indicated below.

1. Round the net weight of this product to he nearest tenth.

16.37 ounces __________ounces

2. Round the product moisture to the nearest tenth and the nearest hundredth.

4.172% __________%

__________%

3. Round the slug weight to the nearest tenth and the nearest one.

254.65 grams __________grams

__________grams

4. Round the following number to the nearest ten thousandth, thousandth, and hundredth.

.01525 __________

____

____

Activity 12 - Rounding Decimals

Directions: Round the following decimals to the nearest tenth:

1) 4.57 ____________________
2) 2.52 ____________________
3) 1.85 ____________________
4) 12.04 ____________________
5) .68 ____________________

Directions: Round the following decimals to the nearest hundredth:

6) 9.048 ____________________
7) 7.563 ____________________
8) 2.497 ____________________
9) 3.299 ____________________
10) .485 ____________________

Directions: Round the following decimals to the nearest thousandth.

11) 5.1836 ____________________
12) 7.4889 ____________________
13) 1.6378 ____________________
14) .2546 ____________________
15) .1168 ____________________

Cluster
Applied Math

Activity 13 - Subtracting Decimals

Objective(s): This activity will enable participants to subtract decimals.

Materials Required:
Pencil
Scratch Paper

You need to know:

1. Write the larger number on top and line up the decimal points one under the other.

EXAMPLE

19.7 - .169

```
19.7
  .169
______
```

2. Add zeros to the right of the decimal point so that each decimal has the same number of places. The top number should have the same number of decimal places as the bottom.

```
  19.700 (minuend)
-   .169 (subtrahend)
```

3. Subtract as you would for the whole numbers and bring down the decimal point in the difference. This decimal point should be aligned under the other decimal points.

```
  19.700
-   .169
  ------
  19.531 (difference or answer)
```

Cluster
Applied Math

Activity 13 - Subtracting Decimals

Directions: Find the differences in the problems below.

(1) 6.2 - 3.76 = ____________________

(2) 45.92 - 23.07 = ____________________

(3) 5 - 2.493 = ____________________

(4) 382 - 46.20 = ____________________

(5) 12 - .936 = ____________________

(6) 835.091 - 482.320 = ____________________

(7) 3.2 - .1986 = ____________________

(8) 78 - 35.83 = ____________________

(9) 29.34 - 16.52 = ____________________

(10) .07 - .002 = ____________________

(11) 1 - .047 = ____________________

(12) .47 - .3992 = ____________________

(13) 89.3 - .764 = ____________________

(14) 963.857 - 241.534 = ____________________

Activity 13 - Subtracting Decimals

Directions: Find the difference in the following problems.

1. 93.7 - 39.48 = ________________

2. 3,724.266 - 859.001 = ______________

3. Calculate the net weight of a box of Better Cheddars®:
   Total package weight (ounces): 9.86; Tare weight (ounces): 1.3

   Net weight: ______________________

4. Calculate the net weight of a box of Honey Maid Graham Crackers®:
   Total package weight (ounces): 17.6; Tare weight (ounces): 1.28

   Net weight: ______________________

5. Suppose the wet weight of a Premium® cracker sample is 89.8 grams. The dry weight is 86.45 grams. What is the difference between the wet and dry weights?

   ____

6. On Thursday, shift 1 produced 646.99 pounds of B&R and shift 2 produced 972.5 pounds. How much more B&R was produced by shift 2 than by shift 1?

   ____

7. The average number of Oreo® units produced per day on shift 1 is 4,000.58. The average number of Oreo® units produced per day on shift 2 is 3,895.6. On average, how many more units does shift 1 produce than shift 2?

   ____

Activity 14 - Comparing Decimals

Objective(s): This activity will enable participants to compare decimals.

Materials Required:
Pencil

You need to know: To compare decimals.....

1. Compare the digits to the left of the decimal point as whole numbers. If one whole number is larger, then that decimal is larger.

   EXAMPLE Compare: 427.36 with 425.263

   427 is larger than 425; therefore 427.36 is larger than 425.263.

2. When the whole numbers in decimals are equal, compare the first digit to the right of the decimal point. If one digit is larger, then that decimal is larger.

   You may give each decimal compared the same number of places by writing in zeros, if necessary. By using zeros as placeholders, you are giving each decimal a common denominator.

   EXAMPLE Compare: 18.331 with 18.47
   (18.331 with 18.470)

   The whole numbers are identical (18 and 18). Four (4) is larger than 3; therefore, 18.47 is larger than 18.331.

3. If the digits in the first place to the right of the decimal point (tenths) are the same, then compare the next place to the right (hundredths). If one digit is larger, then that decimal is larger.

   EXAMPLE Compare: 1.486 with 1.49
   (1.486 with 1.490)

   The whole numbers are identical (1 and 1). The digits in the first place to the right of the decimal point are the same (4 and 4). Nine (9) is larger than 8; therefore, 1.49 is larger than 1.486.

Activity 14 - Comparing Decimals

Directions: Write the larger decimal of each pair in the blank below.

(1) .502 .52 ____________

(2) .17 .21 ____________

(3) .6 .06 ____________

(4) .400 .500 ____________

(5) .30 .90 ____________

(6) .4 .45 ____________

(7) .57 .06 ____________

(8) .7 .2 ____________

(9) .14 .41 ____________

(10) .83 .8 ____________

Activity 15 - Calculating Range Using Decimals

Directions: Circle the largest and the smallest number in each row below. Calculate the range of each row of numbers and write your answer in the blank.

					Range
A)	17.8	17.08	17.1	17.11	________
B)	43	43.1	40	43.01	________
C)	234.9	234.19	233	234	________
D)	16.91	17.1	16.98	17.09	________
E)	23.16	22.93	23.61	23.094	________
F)	18.33	18.32	18.28	18.23	________
G)	51.98	51.	51.9	51.89	________
H)	46.7	46.71	46.75	46.78	________
I)	19.75	19.80	20.00	19.85	________
J)	34.99	34.9	35	35.72	________

Activity 15 - Calculating Range Using Decimals

Directions: Circle the largest and the smallest number in each row below. Calculate the range of each row of numbers and write your answer in the blank.

					Range
A)	16.8	16.08	15.1	15.11	____________
B)	16.3	16.1	15.8	15.9	____________
C)	19.85	20.00	19.75	20.71	____________
D)	243.7	243.17	242.00	243.00	____________
E)	41.0	41.3	40.0	41.6	____________
F)	6.8	7.2	6.9	7.6	____________
G)	1.6	1.2	.8	1.0	____________
H)	3.07	3.04	3.09	3.03	____________
I)	15.85	15.90	16.05	16.25	____________
J)	19.2	19.8	20.4	20.8	____________

Activity 16 - Multiplying Decimals

Objective(s): This activity will enable participants to multiply decimals.

Materials Required:
Pencil
Scratch Paper

You need to know: To multiply decimals, follow the steps below...

1. Line up the numbers one under the other for ease in multiplying. You may ignore the decimal places until you have found the product (number obtained by multiplying).
2. Multiply the decimals just as you would multiply whole numbers.
3. Count the number of decimal places in the numbers you have multiplied. Remember that whole numbers have 0 decimal places.
4. Starting from right to left, count off the same number of decimal places in the product. Place a decimal point in the product.

EXAMPLE
Suppose you are a packing technician employed by Nabisco and you want to compute your wages for a particular week. You earn $ 18.25 per hour and worked 39.75 hours. By multiplying the hourly rate by the number of hours worked, you can compute your pay for the week.

$ 18.25	**hourly rate**
x 39.75	**hours worked**

Activity 16 - Multiplying Decimals (continued)

You need to know:

$$
\begin{array}{cccccccc}
 & & & & 1 & 8. & 2 & 5 \\
 & & & \times & 3 & 9. & 7 & 5 \\
\hline
 & & & & 9 & 1 & 2 & 5 \\
 & & 1 & 2 & 7 & 7 & 5 & \\
 & 1 & 6 & 4 & 2 & 5 & & \\
 & 5 & 4 & 7 & 5 & & & \\
\hline
\$ & 7 & 2 & 5 & 4 & 3 & 7 & 5
\end{array}
$$

partial products

$$
\begin{array}{lrl}
 & \$\,18.25 & \text{2 decimal places} \\
 & \times\ 39.75 & +\ \text{2 decimal places} \\
\hline
\text{product} & \$\,725.4375 & \text{4 decimal places} \\
 & (\$\,725.44) &
\end{array}
$$

5. To multiply decimals by 10, 100, or 1,000...
   a. count the number of zeros in 10, 100, or 1,000.
   b. move the decimal point to the right as many places as there are zeros in 10, 100, or 1,000.
   c. write in additional ending zeros, if necessary.
   d. remember that a whole number is understood to have a decimal point at its right.

Activity 16 - Multiplying Decimals (continued)

You need to know:

EXAMPLES

45. 8 x 10 = 45.8 = 458.

45.8 x 100 = 45.80 = 4,580.

45.8 x 1,000 = 45.800 = 45,800

.136 x 10 = .1 36 = 1.36

.136 x 100 = .13 6 = 13.6

.136 x 1,000 = .136 = 136.

Activity 16 - Multiplying Decimals

(2) Directions: Multiply.

1.	34.7 x 8	2.89 x 7	.551 x 6	60.3 x 9	7.18 x 4
2.	3.8 x 4	.92 x 9	6.7 x 6	5.3 x 8	.84 x 7
3.	41 x .03	78 x .5	59 x .09	86 x .4	19 x .06

Activity 16 - Multiplying Decimals

(3) Directions: Find the products in the problems below.

1.	.09 x .6	.05 x .7	.004 x .3	.08 x .04	.002 x .8
2.	2.8 x 4.3	5.6 x .82	.72 x 5.7	.81 x .69	.94 x 1.8
3.	41.8 x .7	3.90 x .08	.516 x .5	73.8 x .06	3.47 x .4

Activity 16 - Multiplying Decimals

(4) Directions: Multiply.

1.
$$\begin{array}{rrrrr} 5.6 & .73 & 9.2 & .087 & 3.3 \\ \times\ \ .2 & \times\ .08 & \times\ \ .7 & \times\ \ .4 & \times\ .06 \\ \hline \end{array}$$

2.
$$\begin{array}{rrrrr} 30.5 & 7.40 & 61.8 & .514 & 9.06 \\ \times\ .27 & \times\ 6.6 & \times\ 4.8 & \times\ .91 & \times\ 7.3 \\ \hline \end{array}$$

3.
$$\begin{array}{rrrrr} 906 & 504 & 783 & 652 & .467 \\ \times\ .07 & \times .002 & \times\ \ .8 & \times\ .06 & \times .003 \\ \hline \end{array}$$

Activity 16 - Multiplying Decimals

(5) Directions: Multiply.

1.	.02 x .8	.25 x .04	1.2 x .008	.073 x .05
2.	14.21 x 35	.216 x .24	17.7 x 2.5	3.2 x 87
3.	547.1 x .73	3.07 x 731	17.39 x 12.4	1.754 x .23
4.	4.08 x .0017	.0125 x .315	.468 x .1302	.12121 x .03

Activity 16 - Multiplying Decimals

(6) Directions: Multiply.

1.	17.32 x .16	.0648 x 2.3	913.2 x .049	40.21 x 20.8
2.	45.21 x 5.6	3.748 x 73	206.9 x .28	.7488 x 4.9
3.	.2789 x .17	3.845 x 29.2	5183.6 x .0016	303.003 x 56.8

Activity 16 - Multiplying Decimals By 10, 100, or 1,000

(7) Directions: Use the shortcut to multiply each of the following problems.

1. 10 x 7.6 = ____________________
2. 100 x .013 = ____________________
3. 10 x 7.64 = ____________________
4. 10 x .013 = ____________________
5. 10 x .7839 = ____________________
6. 100 x .002 = ____________________
7. 1,000 x .7839 = ____________________
8. 10 x .9084 = ____________________
9. 1,000 x .7839 = ____________________
10. 1,000 x 908.4 = ____________________
11. 10 x 7.9 = ____________________
12. 100 x 90.84 = ____________________

Activity 16 - Multiplying Decimals By 10, 100, or 1,000

(8) Directions: Multiply each of the following problems using the shortcut.

1. .2 x 10 = ____________________
2. 45.06 x 100 = ____________________
3. 72.4 x 100 = ____________________
4. .35 x 10 = ____________________
5. .539 x 100 = ____________________
6. .457 x 1,000 = ____________________
7. .05 x 100 = ____________________
8. 42.4 x 100 = ____________________
9. 86.73 x 1,000 = ____________________
10. 2.97 x 100 = ____________________
11. 22.8 x 1,000 = ____________________
12. .9 x 1,000 = ____________________

Activity 16 - Multiplying Decimals By 10, 100, or 1,000

(9) Directions: Multiply each of the following problems using the shortcut.

1) .34 x 10 =   1.24 x 100 =   3.85 x 1,000 =

2) .03 x 100 =   .275 x 100 =   8.9 x 100 =

3) .8 x 10 =   .09 x 10 =   3.64 x 10 =

4) .9 x 1,000 =   2.36 x 1,000 =   .475 x 1,000 =

5) .06 x 1,000 =   .863 x 100 =   .721 x 10 =

6) 1.6 x 1,000 =

Activity 16 - Multiplying Decimals

(1) Directions: Find the following products.

1. 1.14 x .8 = .912

2. .23 x .47 = .1081

3. 6.59 x .701 = 4.61959

4. Suppose you make $16.75 per hour. Last week you worked 39.5 hours. What will be your gross wages for the week?

   $ 661.625 ($ 661.63)

5. The net weight of a box of crackers is 13.5 ounces. Assuming that all boxes have the same net weights, how much will 12 boxes weigh?

   162 ounces

If you have less than 4 correct, see your instructor for additional help.

Activity 16 - Multiplying Decimals

(2) Directions: Multiply.

1.	34.7	2.89	.551	60.3	7.18
	x 8	x 7	x 6	x 9	x 4
	277.6	20.23	3.306	542.7	28.72
2.	3.8	.92	6.7	5.3	.84
	x 4	x 9	x 6	x 8	x 7
	15.2	8.28	40.2	42.4	5.88
3.	41	78	59	86	19
	x .03	x .5	x .09	x .4	x .06
	1.23	39	5.31	34.4	1.14

If you have less than 12 correct, see your instructor for additional help.

Activity 17 - Dividing Decimals By Whole Numbers

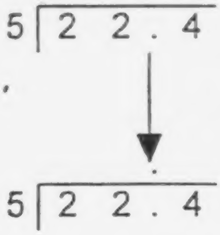
Objective(s): This activity will enable participants to divide decimals by whole numbers.

Materials Required:
Pencil
Scratch Paper

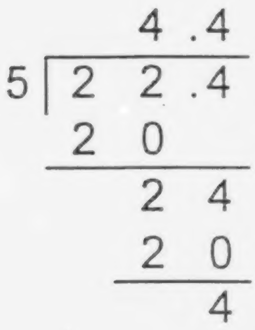
You need to know: To divide decimals by whole numbers...

1. Place the decimal point up in the quotient (answer) directly above its position in the dividend (problem).

EXAMPLE



2. Divide as you would whole numbers until all digits of the dividend have been used.



Activity 17 - Dividing Decimals By Whole Numbers (continued)

4. Suppose you were asked to calculate the average machine downtime for each of the 7 production lines in the Richmond bakery on a given day. You would divide the total downtime hours by the number of lines. Round the answer to the nearest hundredth.

<u>EXAMPLE</u> $7\overline{)\;28.6}$

Total Machine Downtime Hours	28.6
Number Of Lines	7

```
       4 . 0 8 5   = 4.09   Answer
   7 ⟌ 2 8 . 6 0
       2 8
       -------
           6
           0
           ----
           6 0
           5 6
           ------
             4 0
             3 5
             ----
               5
```

5. To divide decimals by 10, 100, or 1,000...
   a. count the number of zeros in 10, 100, or 1,000.
   b. move the decimal point to the left as many places as there are zeros in 10, 100, or 1,000.
   c. write in additional ending zeros, if necessary.

4.63 ÷ 10 = .4 63 = .463

29.5 ÷ 100 = 2 9 5 = .295

.075 ÷ 1,000 = 0 0 0 075 = .000075

Activity 17 - Dividing Decimals By Whole Numbers (continued)

You need to know:

3. Write the remainder over the divisor as a fraction.

$$\begin{array}{rl}
 & 4.4\tfrac{4}{5} \\
5 & \overline{)22.4} \\
 & \underline{20} \\
 & 24 \\
 & \underline{20} \\
 & 4
\end{array}$$

OR

Divide further by adding ending zeros.

$$\begin{array}{rl}
 & 4.48 \\
5 & \overline{)22.40} \\
 & \underline{20} \\
 & 24 \\
 & \underline{20} \\
 & 40 \\
 & \underline{40}
\end{array}$$

Activity 17 - Dividing Decimals By Whole Numbers

(1) Directions: Find the quotients in the problems below.

1. $3\overline{).27}$ $2\overline{).492}$ $27\overline{)85.32}$ $12\overline{).150}$

2. $5\overline{).45}$ $6\overline{)36.12}$ $34\overline{)356.32}$ $8\overline{).526}$

3. $8\overline{).56}$ $12\overline{)74.76}$ $64\overline{)58.56}$ $76\overline{)12.54}$

Activity 17 - Dividing Decimals By Whole Numbers

(2) Directions: Find the quotients in the problems below.

1.	$8\overline{).192}$	$3\overline{)148.8}$	$5\overline{)19.45}$	$4\overline{)2.524}$
2.	$6\overline{)13.8}$	$9\overline{)70.2}$	$4\overline{).384}$	$7\overline{)57.75}$
3.	$16\overline{)76.8}$	$21\overline{)7.56}$	$19\overline{)1.52}$	$38\overline{)216.6}$
4.	$52\overline{)9.516}$	$43\overline{)1565.2}$	$77\overline{)464.31}$	$65\overline{)33.605}$

Activity 17 - Dividing Decimals By 10, 100, or 1,000

(3) Directions: Find the quotients using the shortcut.

1. .62 ÷ 10 = ______ 5.74 ÷ 100 = ______

2. .3 ÷ 10 = ______ 12.09 ÷ 100 = ______

3. .08 ÷ 100 = ______ .834 ÷ 100 = ______

4. 21.6 ÷ 100 = ______ 38.6 ÷ 1,000 = ______

5. 84.7 ÷ 100 = ______

Activity 17 - Dividing Decimals By 10, 100, or 1,000

(4) Directions: Find the quotients using the shortcut.

1. 7.7 ÷ 10 = ______ .14 ÷ 10 = ______

2. 52.9 ÷ 100 = ______ 64.7 ÷ 1,000 . = ______

3. .239 ÷ 1,000 = ______ 58.09 ÷ 1,000 = ______

4. 8.306 ÷ 100 = ______ 50.73 ÷ 1,000 = ______

5. .4 ÷ 1,000 = ______

Activity 18 - Dividing Decimals By Decimals

Objective(s): This activity will enable participants to divide decimals by decimals.

Materials Required:
Pencil
Scratch Paper

You need to know: To divide decimals by decimals...

1. Make the divisor a whole number by moving the decimal point to the right as far as it will go.

   EXAMPLE

   $7.5\overline{)\,2.25}$ $\qquad$ $7\,.\,5\overline{)\,2.25}$

2. Move the decimal point in the divident the same number of places to the right that you moved the point in the divisor.

   $7\,.\,5\overline{)\,2.2\;5}$

3. Place a decimal point in the quotient directly above its new position in the dividend.

$$\begin{array}{r} . \\ 7\,.\,5\overline{)\,2.2\;\;5} \end{array}$$

Activity 18 - Dividing Decimals By Decimals (continued)

You need to know:

4. Divide as you would divide a decimal by a whole number.

$$\begin{array}{r} .3 \\ 75\,\overline{)\,22.5} \\ 22\ \ 5 \end{array}$$

5. Sometimes it is necessary to add ending zeros to the dividend in order to have enough places to move the decimal point. Create the same number of places in the dividend as are in the divisor. Continue dividing until quotient has as many places as are required for the answer.

EXAMPLE

$$.008\,\overline{)\,44.8}$$

$$\begin{array}{r} 5\,6\,0\,0. \\ .008\,\overline{)\,4\,4.8\,0\,0} \\ 4\,0. \\ \hline 4\,8 \\ 4\,8 \\ \hline 0 \\ 0 \\ \hline 0 \\ \hline 0 \end{array}$$

Activity 18 - Dividing Decimals By Decimals (continued)

6. To check your answers, multiply the quotient by the original divisor (the decimal). You should get the dividend.

CHECK

5600	quotient
x .008	original divisor
44.800	dividend

Activity 18 - Dividing Decimals By Decimals

(3) Directions: Find the quotients in the problems below.

1. $.8\overline{)7.68}$ $.7\overline{)26.6}$

2. $4.1\overline{)1.148}$ $9.2\overline{)128.8}$

3. $.06\overline{)0.882}$ $.28\overline{).5404}$

4. $8.7\overline{).522}$ $.19\overline{).3933}$

Activity 18 - Dividing Decimals By Decimals

(4) Directions: Find the quotients in the problems below. Check your answers.

1. $.007\overline{)5.32}$ $.009\overline{)4.32}$

2. $.016\overline{)212.8}$ $.025\overline{).1}$

3. $.003\overline{)8.1}$ $.008\overline{)77.12}$

4. $.091\overline{)65.52}$ $.68\overline{)57.8}$

Activity 18 - Dividing Decimals By Decimals

(5) Directions: Divide and check.

1. $.0018\overline{)1.683}$ $.0073\overline{)15.184}$

2. $.0024\overline{).78}$ $.0006\overline{)42.84}$

3. $.008\overline{)4.48}$ $.06\overline{)558.6}$

4. $.32\overline{)156.8}$ $.45\overline{)1381.5}$

Activity 18 - Dividing Decimals By Decimals

(2) Directions: Find the quotients in the problems below.

1. $.6\overline{)0.42}$ $.4\overline{)2.76}$

2. $5.3\overline{)4.399}$ $3.2\overline{)0.288}$

3. $.75\overline{)453.75}$ $.52\overline{)6.656}$

4. $3.6\overline{)145.44}$ $.64\overline{).11648}$

Activity 18 - Dividing Decimals By Decimals

(1) Directions: Find the quotients in the problems below.

1. $.4\overline{).8}$ $.07\overline{)4.921}$ $.25\overline{)16.5}$ $4.4\overline{)82.28}$

2. $.15\overline{).45}$ $.6\overline{)72.18}$ $.06\overline{)5.6}$ $.08\overline{)170.4}$

3. $.12\overline{)1.56}$ $1.04\overline{)93.8}$ $6.8\overline{)44.2}$ $3.8\overline{)62.7}$

Applied Math
PINK

Activity 19 - Calculating Percent of Oil

All ingredients in a product must be added in the amount specified by the master recipe. By doing so, consistency is maintained in the product and the product complies with labeling information provided for the consumer.

For instance the correct amount of spray oil on a product must be monitored. To perform this calculation you need to take weights, read the scale, subtract, divide, and multiply.

Step 1:
Record the dry weight of the product

Step 2:
Record the wet weight of the product (after the oil spray machine)

Step 3:
Subtract the dry weight from the wet weight

Step 4:
Divide the wet weight into the answer for step 3

Step 5:
Multiply your answer by 100. The answer is the percent of oil in that sample.

Now try the following:

	Wet Wt.	Dry Wt.	% Oil
1.	50	45	__________
2.	69	63	__________
3.	100	90	__________
4.	112	110	__________

Activity 20 - Calculating Cubic Footage

When working in Environmental Services, an employee must sometimes spray designated areas to prevent infestation. The chemicals must be used according to the label directions for the amount of space to be sprayed. Therefore, the cubic footage of the area to be sprayed must be determined.

To calculate cubic footage you must be able to measure width, length, height and then multiply.

If a room measures 70 feet by 80 feet and is 20 feet high, you multiply.
70 X 80 X 20 = 112,000 cubic feet.

Find the cubic footage of the following rooms.

Room A measures
100 ft. long, 45 ft. wide, 25 feet tall __________cu. ft.

Room B measures
12 ft. wide, 15 ft. long, 8 ft. tall __________cu. ft.

Room C measures
35.5 ft. long, 22.25 ft. wide, 12 ft. tall __________cu. ft.

Activity 21 - Calculating Sprays

An Environmental Services employee must sometimes use a spraying device for tasks such as administering pesticides. How much liquid you put in the spraying device is determined by the label directions and the amount of area or space to be sprayed.

First, you must calculate the space as you did in the previous activity. Next, you follow label directions, using division to calculate the amount of liquid to pour into the tank.

For instance, if the area to be sprayed is 10,000 cubic feet, and one gallon sprays 5,000 cubic feet, you will need 2 gallons, because

10,000 ÷ 5,000 = 2

Use the room measurements in the previous activity to calculate how many gallons of liquid will be needed if one gallon is necessary for 1000 cubic feet.

Room A __________gallons

Room B __________ gallons

Room C __________ gallons

ANSWER KEYS

Activity 1 - Whole Numbers (continued)

Directions: For each of the following numbers place a (✓) in the space if the number is a whole number.

✓ ______ 1. 4,699
______ 2. 96.677
✓ ______ 3. 620
______ 4. 2.053
______ 5. .4001
✓ ______ 6. 28
______ 7. .1
______ 8. 8,261.1
______ 9. 1.25
______ 10. 27,611.9
______ 11. .07
______ 12. .0001
______ 13. .367
✓ ______ 14. 3,842
✓ ______ 15. 493,200

✓ ______ 16. 926.
______ 17. 6.790
✓ ______ 18. 58,416
✓ ______ 19. 6,815
✓ ______ 20. 649,873
______ 21. .072
______ 22. .84
______ 23. .7159
______ 24. .638
______ 25. .3901
______ 26. 495.28
______ 27. 6215.9
______ 28. 518.7302
______ 29. 429,631.058
______ 30. 85,210.3697

If you have less than 24 correct, see your instructor for additional help.

Activity 1 - Whole Numbers (continued)

Directions: Write examples of whole numbers in the following blanks.

____________ 1.
____________ 2.
____________ 3.
____________ 4.
____________ 5.
____________ 6.
____________ 7.
____________ 8.
____________ 9.
____________ 10.
____________ 11.
____________ 12.
____________ 13.
____________ 14.
____________ 15.
____________ 16.
____________ 17.
____________ 18.
____________ 19.
____________ 20.
____________ 21.
____________ 22.
____________ 23.
____________ 24.
____________ 25.
____________ 26.
____________ 27.
____________ 28.
____________ 29.
____________ 30.

If you have less than 24 correct, see your instructor for additional help.

Activity 2 - Place Values and Whole Numbers (continued)

1. In the number 283, how much is the **8** worth? 80
2. In the number 1,296, how much is the **1** worth? 1,000
3. In the number 926, how much is the **6** worth? 6
4. In the number 637, how much is the **6** worth? 600
5. In the number 240, how much is the **4** worth? 40
6. In the number 318, how much is the **8** worth? 8
7. In the number 1,873, how much is the **7** worth? 70
8. In the number 8,176, how much is the **8** worth? 8,000
9. In the number 561, how much is the **5** worth? 500
10. In the number 746,721, how much is the **4** worth? 40,000
11. In the number 678, how much is the **7** worth? 70
12. In the number 3,016, how much is the **3** worth? 3,000
13. In the number 235,619, how much is the **2** worth? 200,000
14. In the number 145,768, how much is the **5** worth? 5,000
15. The value of 9 in the number 3,73**9**,681 is: 9,000
16. The value of 7 in the number 8**7**3,000 is: 70,000
17. The value of 6 in the number **6**,284,925 is: 6,000,000
18. The value of 4 in the number **4**6,867 is: 40,000
19. The value of 8 in the number 1,**8**63,745 is: 800,000
20. The value of 3 in the number 5,6**3**2 is: 30
21. The value of 7 in the number 3,**7**54 is: 700
22. The value of 5 in the number 2,38**5** is: 5
23. The value of 3 in the number **3**29 is: 300
24. The value of 6 in the number 7**6** is: 6
25. The value of 4 in the number 6**4** is: 4

If you have less than 20 correct, see your instructor for additional help.

Activity 2 - Place Values and Whole Numbers (continued)

Directions: Fill in the blanks with the correct numbers.

(1) In the number **6,973**.....
the value of 3 is **3** ones or **3**.
the value of 7 is **7** tens or **70**.
the value of 9 is **9** hundreds or **900**.
the value of 6 is **6** thousands or **6,000**.

(2) In the number **1,478**.....
the value of 8 is **8** ones or **8**.
the value of 7 is **7** tens or **70**.
the value of 4 is **4** hundreds or **400**.
the value of 1 is **1** thousand(s) or **1,000**.

(3) In the number **11,243**.....
the value of 3 is **3** ones or **3**.
the value of 4 is **4** tens or **40**.
the value of 2 is **2** hundreds or **200**.
the value of 11 is **11** thousands or **11,000**.

(4) In the number **48,505**.....
the value of 5 is **5** ones or **5**.
the value of 0 is **0** tens or **0**.
the value of 5 is **5** hundreds or **500**.
the value of 48 is **48** thousands or **48,000**.

(5) In the number **6,054**.....
the value of 4 is **4** ones or **4**.
the value of 5 is **5** tens or **50**.
the value of 0 is **0** hundreds or **0**.
the value of 6 is **6** thousands or **6,000**.

Activity 2 - Place Values and Whole Numbers (continued)

Directions: Fill in the blanks with the correct numbers.

(6) In the number 742.....
the value of 2 is **2** ones or **2**.
the value of 4 is **4** tens or **40**.
the value of 7 is **7** hundreds or **700**.

(7) In the number 8,137.....
the value of 7 is **7** ones or **7**.
the value of 3 is **3** tens or **30**.
the value of 1 is **1** hundred(s) or **100**.
the value of 8 is **8** thousands or **8,000**.

(8) In the number 689.....
the value of 9 is **9** ones or **9**.
the value of 8 is **8** tens or **80**.
the value of 6 is **6** hundreds or **600**.

(9) In the number 38,496.....
the value of 6 is **6** ones or **6**.
the value of 9 is **9** tens or **90**.
the value of 4 is **4** hundreds or **400**.
the value of 38 is **38** thousands or **38,000**.

(10) In the number 379.....
the value of 9 is **9** ones or **9**.
the value of 7 is **7** tens or **70**.
the value of 3 is **3** hundreds or **300**.

If you have less than 8 correct, see your instructor for additional help.

Activity 2 - Place Values and Whole Numbers (continued)

Directions: Answer the following by placing the correct digit in the space.

1. 561 Which digit is in the tens place? 6
2. 780 Which digit is in the hundreds place? 7
3. 42,625 Which digit is in the ten thousands place? 4
4. 3,439 Which digit is in the hundreds place? 4
5. 657,524 Which digit is in the thousands place? 7
6. 4,075 Which digit is in the units place? 5
7. 7,302 Wich digit is in the hundreds place? 3
8. 428,713 Which digit is in the hundred thousands place? 4
9. 9,371,246 Which digit is in the millions place? 9
10. 32,584 Which digit is in the units place? 4
11. 529,682 Which digit is in the thousands place? 9
12. 115,035 Which digit is in the hundred thousands place? 1
13. 8,851 Which digit is in the tens place? 5
14. 738,495 Which digit is in the ten thousands place? 3
15. 2,700,920 Which digit is in the millions place? 2

If you have less than 12 correct, see your instructor for additional help.

Activity 2 - Place Values and Whole Numbers (continued)

Directions: Show the place value of the following numbers by writing the digits correctly on the chart. An example has been completed for you.
EXAMPLE: 7,654

	Millions	Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones
				7,	6	5	4
1.				6,	7	0	0
2.			5	3,	4	2	6
3.	74,	8	0	3,	0	0	0
4.					1	7	5
5.			3	2,	0	7	2
6.	8,	1	1	5,	0	3	5
7.				3,	5	8	2
8.					4	9	3
9.		3	5	8,	2	8	1
10.				1,	6	6	1
11.		1	0	5,	3	0	2
12.			2	9,	5	4	7
13.					2	8	4
14.		1	3	5,	0	1	1
15.			2	2,	3	1	4
16.					3	2	1
17.		3	8	7,	6	1	1
18.			8	8,	0	2	7
19.	2,	7	0	0,	9	2	0
20.				4,	2	2	8

If you have less than 16 correct, see your instructor for additional help.

Activity 2 - Place Values and Whole Numbers (continued)

EXAMPLE	7,654
1.	6,700
2.	53,426
3.	74,803,000
4.	175
5.	32,072
6.	8,115,035
7.	3,582
8.	493
9.	358,281
10.	1,661
11.	105,302
12.	29,547
13.	284
14.	135,011
15.	22,314
16.	321
17.	387,611
18.	88,027
19.	2,700,920
20.	4,228

Activity 3 - Reading and Writing Whole Numbers (continued)

1. eight thousand four hundred ninety-seven
2. seven thousand forty-two thousand, three hundred fifty-one
3. nine hundred thirty-two thousand, six hundred seventeen
4. seven million, six hundred thirty-nine thousand, seven hundred ninety two
5. twenty five thousand, eight hundred sixteen
6. one hundred seventy-three thousand, eight hundred fifty-five
7. six million, three hundred eighty-two thousand, five hundred twenty-three
8. seven hundred eighty two thousand, three hundred eighty-six
9. one million, one hundred seventy-five thousand, one hundred forty
10. ninety-seven thousand, two hundred sixty eight
11. six thousand, nine hundred seventy three
12. three hundred eighty two
13. four thousand, eight hundred eighty
14. fourteen million, two hundred twenty-eight thousand, seven hundred eighty six
15. eight hundred sixty-five
16. ninety-seven thousand, two hundred sixty-eight
17. two hundred forty-three
18. twenty seven thousand, two hundred sixty-eight
19. one thousand four hundred seventy-eight
20. two hundred fifty seven

Activity 3 - Reading and Writing Whole Numbers (continued)

21. four thousand three hundred twenty-one
22. twenty eight
23. five thousand, five hundred four
24. four hundred fifty seven
25. thirty nine
26. eight hundred forty seven
27. three hundred eighty six
28. two thousand, one hundred thirty one
29. one hundred fifty-nine
30. fourteen
31. two hundred forty nine thousand, three hundred eighty-two
32. three hundred sixty
33. eight hundred twenty nine
34. two hundred forty seven million, four hundred twenty seven thousand, eight hundred twenty
35. thirty-seven
36. eighty nine thousand, eight hundred twenty seven
37. twenty two thousand, eight hundred nine
38. eighty-eight
39. seven hundred thirty-eight million, two hundred sixty four thousand, six hundred ninety-nine
40. seven hundred fifty-eight

If you have less than 32 correct, see your instructor for additional help.

Activity 3 - Reading and Writing Whole Numbers (continued)

1. thirty-four thousand eighty six
2. eight hundred two
3. sixty-three thousand five hundred twenty-two
4. three hundred thirty nine
5. seven thousand seven hundred forty
6. nine million eight hundred twenty-three thousand five hundred twenty-seven
7. five hundred seventy eight
8. one hundred thirty five thousand eight hundred fifty one
9. forty-nine thousand seven hundred thirty-six
10. thirteen million four hundred thirty-six thousand nine hundred thirty-two
11. two thousand five hundred fifteen
12. two hundred four thousand nine hundred seventy-two
13. nine hundred ninety-eight thousand five hundred sixty
14. four thousand eighty-two
15. five thousand one hundred twelve

If you have less than 12 correct, see your instructor for additional help.

Activity 3 - Reading and Writing Whole Numbers (continued)

Directions: Write the following numbers, using figures, in the chart below. Make sure you put each digit in the correct column. Insert commas, where applicable.

	Billions	Hundred Millions	Ten Millions	Millions	Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Units or Ones
1.						3	4,	0	8	6
2.								8	0	2
3.						6	3,	5	2	2
4.								3	3	9
5.							7,	7	4	0
6.				9,	8	2	3,	5	2	7
7.								5	7	8
8.					1	3	5,	8	5	1
9.						4	9,	7	3	6
10.			1	3,	4	3	6,	9	3	2
11.							2,	5	1	5
12.					2	0	4,	9	7	2
13.					9	9	8,	5	6	0
14.							4,	0	8	2
15.							5,	1	1	2

Activity 4 - Adding Whole Numbers

(1) Directions: Add.

1. $\begin{array}{r} 3 \\ + \ 5 \\ \hline 8 \end{array}$ $\begin{array}{r} 5 \\ + \ 0 \\ \hline 5 \end{array}$ $\begin{array}{r} 2 \\ + \ 6 \\ \hline 8 \end{array}$ $\begin{array}{r} 1 \\ + \ 5 \\ \hline 6 \end{array}$ $\begin{array}{r} 0 \\ + \ 2 \\ \hline 2 \end{array}$

2. $\begin{array}{r} 1 \\ + \ 8 \\ \hline 9 \end{array}$ $\begin{array}{r} 4 \\ + \ 5 \\ \hline 9 \end{array}$ $\begin{array}{r} 3 \\ + \ 5 \\ \hline 8 \end{array}$ $\begin{array}{r} 2 \\ + \ 6 \\ \hline 8 \end{array}$ $\begin{array}{r} 0 \\ + \ 8 \\ \hline 8 \end{array}$

3. $\begin{array}{r} 2 \\ + \ 2 \\ \hline 4 \end{array}$ $\begin{array}{r} 5 \\ + \ 3 \\ \hline 8 \end{array}$ $\begin{array}{r} 3 \\ + \ 6 \\ \hline 9 \end{array}$ $\begin{array}{r} 6 \\ + \ 1 \\ \hline 7 \end{array}$ $\begin{array}{r} 3 \\ + \ 3 \\ \hline 6 \end{array}$

4. $\begin{array}{r} 1 \\ + \ 2 \\ \hline 3 \end{array}$ $\begin{array}{r} 4 \\ + \ 3 \\ \hline 7 \end{array}$ $\begin{array}{r} 1 \\ + \ 1 \\ \hline 2 \end{array}$ $\begin{array}{r} 5 \\ + \ 2 \\ \hline 7 \end{array}$ $\begin{array}{r} 4 \\ + \ 1 \\ \hline 5 \end{array}$

5. $\begin{array}{r} 7 \\ + \ 1 \\ \hline 8 \end{array}$ $\begin{array}{r} 6 \\ + \ 3 \\ \hline 9 \end{array}$ $\begin{array}{r} 9 \\ + \ 0 \\ \hline 9 \end{array}$ $\begin{array}{r} 2 \\ + \ 7 \\ \hline 9 \end{array}$ $\begin{array}{r} 3 \\ + \ 4 \\ \hline 7 \end{array}$

If you have less than 20 correct, see your instructor for additional help.

Activity 4 - Adding Whole Numbers

(1) Directions: Add.

1. $$\begin{array}{r} 3 \\ +\ 5 \\ \hline 8 \end{array} \qquad \begin{array}{r} 5 \\ +\ 0 \\ \hline 5 \end{array} \qquad \begin{array}{r} 2 \\ +\ 6 \\ \hline 8 \end{array} \qquad \begin{array}{r} 1 \\ +\ 5 \\ \hline 6 \end{array} \qquad \begin{array}{r} 0 \\ +\ 2 \\ \hline 2 \end{array}$$

2. $$\begin{array}{r} 1 \\ +\ 8 \\ \hline 9 \end{array} \qquad \begin{array}{r} 4 \\ +\ 5 \\ \hline 9 \end{array} \qquad \begin{array}{r} 3 \\ +\ 5 \\ \hline 8 \end{array} \qquad \begin{array}{r} 2 \\ +\ 6 \\ \hline 8 \end{array} \qquad \begin{array}{r} 0 \\ +\ 8 \\ \hline 8 \end{array}$$

3. $$\begin{array}{r} 2 \\ +\ 2 \\ \hline 4 \end{array} \qquad \begin{array}{r} 5 \\ +\ 3 \\ \hline 8 \end{array} \qquad \begin{array}{r} 3 \\ +\ 6 \\ \hline 9 \end{array} \qquad \begin{array}{r} 6 \\ +\ 1 \\ \hline 7 \end{array} \qquad \begin{array}{r} 3 \\ +\ 3 \\ \hline 6 \end{array}$$

4. $$\begin{array}{r} 1 \\ +\ 2 \\ \hline 3 \end{array} \qquad \begin{array}{r} 4 \\ +\ 3 \\ \hline 7 \end{array} \qquad \begin{array}{r} 1 \\ +\ 1 \\ \hline 2 \end{array} \qquad \begin{array}{r} 5 \\ +\ 2 \\ \hline 7 \end{array} \qquad \begin{array}{r} 4 \\ +\ 1 \\ \hline 5 \end{array}$$

5. $$\begin{array}{r} 7 \\ +\ 1 \\ \hline 8 \end{array} \qquad \begin{array}{r} 6 \\ +\ 3 \\ \hline 9 \end{array} \qquad \begin{array}{r} 9 \\ +\ 0 \\ \hline 9 \end{array} \qquad \begin{array}{r} 2 \\ +\ 7 \\ \hline 9 \end{array} \qquad \begin{array}{r} 3 \\ +\ 4 \\ \hline 7 \end{array}$$

If you have less than 20 correct, see your instructor for additional help.

Activity 4 - Adding Whole Numbers

(2) Directions: Add.

1.	$\begin{array}{r} 3 \\ +\ 9 \\ \hline 12 \end{array}$	$\begin{array}{r} 5 \\ +\ 7 \\ \hline 12 \end{array}$	$\begin{array}{r} 9 \\ +\ 9 \\ \hline 18 \end{array}$	$\begin{array}{r} 8 \\ +\ 4 \\ \hline 12 \end{array}$	$\begin{array}{r} 3 \\ +\ 8 \\ \hline 11 \end{array}$
2.	$\begin{array}{r} 8 \\ +\ 7 \\ \hline 15 \end{array}$	$\begin{array}{r} 6 \\ +\ 6 \\ \hline 12 \end{array}$	$\begin{array}{r} 7 \\ +\ 3 \\ \hline 10 \end{array}$	$\begin{array}{r} 5 \\ +\ 9 \\ \hline 14 \end{array}$	$\begin{array}{r} 5 \\ +\ 5 \\ \hline 10 \end{array}$
3.	$\begin{array}{r} 4 \\ +\ 6 \\ \hline 10 \end{array}$	$\begin{array}{r} 9 \\ +\ 2 \\ \hline 11 \end{array}$	$\begin{array}{r} 7 \\ +\ 6 \\ \hline 13 \end{array}$	$\begin{array}{r} 5 \\ +\ 6 \\ \hline 11 \end{array}$	$\begin{array}{r} 4 \\ +\ 9 \\ \hline 13 \end{array}$
4.	$\begin{array}{r} 3 \\ +\ 2 \\ \hline 5 \end{array}$	$\begin{array}{r} 5 \\ +\ 4 \\ \hline 9 \end{array}$	$\begin{array}{r} 6 \\ +\ 0 \\ \hline 6 \end{array}$	$\begin{array}{r} 6 \\ +\ 3 \\ \hline 9 \end{array}$	$\begin{array}{r} 4 \\ +\ 5 \\ \hline 9 \end{array}$
5.	$\begin{array}{r} 8 \\ +\ 8 \\ \hline 16 \end{array}$	$\begin{array}{r} 6 \\ +\ 8 \\ \hline 14 \end{array}$	$\begin{array}{r} 9 \\ +\ 7 \\ \hline 16 \end{array}$	$\begin{array}{r} 8 \\ +\ 5 \\ \hline 13 \end{array}$	$\begin{array}{r} 7 \\ +\ 7 \\ \hline 14 \end{array}$

If you have less than 20 correct, see your instructor for additional help.

Activity 4 - Adding Whole Numbers

(3) Directions: Add.

1.
$$\begin{array}{r} 6 \\ 4 \\ +\ 5 \\ \hline 15 \end{array} \qquad \begin{array}{r} 9 \\ 6 \\ +\ 6 \\ \hline 21 \end{array} \qquad \begin{array}{r} 2 \\ 3 \\ +\ 8 \\ \hline 13 \end{array} \qquad \begin{array}{r} 1 \\ 9 \\ +\ 4 \\ \hline 14 \end{array} \qquad \begin{array}{r} 6 \\ 2 \\ +\ 3 \\ \hline 11 \end{array}$$

2.
$$\begin{array}{r} 8 \\ 6 \\ +\ 7 \\ \hline 21 \end{array} \qquad \begin{array}{r} 7 \\ 0 \\ +\ 6 \\ \hline 13 \end{array} \qquad \begin{array}{r} 9 \\ 1 \\ +\ 8 \\ \hline 18 \end{array} \qquad \begin{array}{r} 5 \\ 2 \\ +\ 2 \\ \hline 9 \end{array} \qquad \begin{array}{r} 8 \\ 5 \\ +\ 9 \\ \hline 22 \end{array}$$

3.
$$\begin{array}{r} 4 \\ 9 \\ 8 \\ +\ 1 \\ \hline 22 \end{array} \qquad \begin{array}{r} 5 \\ 6 \\ 7 \\ +\ 6 \\ \hline 24 \end{array} \qquad \begin{array}{r} 3 \\ 4 \\ 8 \\ +\ 9 \\ \hline 24 \end{array} \qquad \begin{array}{r} 4 \\ 3 \\ 8 \\ +\ 8 \\ \hline 23 \end{array} \qquad \begin{array}{r} 9 \\ 7 \\ 2 \\ +\ 3 \\ \hline 26 \end{array}$$

4.
$$\begin{array}{r} 8 \\ 6 \\ 8 \\ +\ 4 \\ \hline 26 \end{array} \qquad \begin{array}{r} 3 \\ 2 \\ 7 \\ +\ 6 \\ \hline 18 \end{array} \qquad \begin{array}{r} 5 \\ 5 \\ 1 \\ +\ 0 \\ \hline 11 \end{array} \qquad \begin{array}{r} 9 \\ 6 \\ 5 \\ +\ 7 \\ \hline 27 \end{array} \qquad \begin{array}{r} 6 \\ 7 \\ 3 \\ +\ 7 \\ \hline 18 \end{array}$$

If you have less than 16 correct, see your instructor for additional help.

Cluster
Applied Math

Activity 4 - Adding Whole Numbers

(4) Directions: Add.

1.	2	18	3	14	5	61	3	62	5	9
	+ 95	+ 9	+ 35	+ 3	+ 37	+ 5	+ 13	+ 9	+ 36	+ 47
	97	27	38	17	42	66	16	71	41	56
2.	11	15	18	12	17	14	19	16	13	18
	+ 2	+ 9	+ 7	+ 5	+ 8	+ 6	+ 4	+ 1	+ 5	+ 9
	13	24	25	17	25	20	23	17	18	27
3.	72	86	93	2	5	7	84	96	57	3
	+ 4	+ 9	+ 3	+ 75	+ 88	+ 99	+ 1	+ 6	+ 9	+ 37
	76	95	96	77	93	106	85	102	66	40
4.	23	2	21	1	28	7	29	6	26	29
	+ 4	+ 26	+ 3	+ 25	+ 8	+ 24	+ 5	+ 22	+ 8	+ 7
	27	28	24	26	36	31	34	28	34	36
5.	4	5	97	3	2	76	6	7	49	8
	+ 73	+ 89	+ 8	+ 56	+ 66	+ 1	+ 82	+ 94	+ 5	+ 39
	77	94	105	59	68	77	88	101	54	47
6.	48	54	7	78	83	3	41	52	4	28
	+ 6	+ 2	+ 67	+ 9	+ 4	+ 91	+ 1	+ 8	+ 37	+ 6
	54	56	74	87	87	94	42	60	41	34
7.	1	8	7	6	4	2	9	5	3	7
	+ 37	+ 34	+ 32	+ 39	+ 31	+ 35	+ 38	+ 33	+ 36	+ 38
	38	42	39	45	35	37	47	38	39	45

If you have less than 56 correct, see your instructor for additional help.

Activity 4 - Adding Whole Numbers

(5) Directions: Add.

1.	1	6	42	59	9	2	87	98	3	5
	+ 23	+ 34	+ 7	+ 4	+ 69	+ 74	+ 3	+ 8	+ 98	+ 59
	24	40	49	63	78	76	90	106	101	64
2.	41	1	42	2	44	7	46	6	48	9
	+ 5	+ 48	+ 8	+ 47	+ 9	+ 49	+ 4	+ 43	+ 5	+ 46
	46	49	50	49	53	56	50	49	53	55
3.	29	33	1	8	22	36	2	6	64	5
	+ 5	+ 9	+ 45	+ 19	+ 7	+ 4	+ 16	+ 27	+ 8	+ 37
	34	42	46	27	29	40	18	33	72	42
4.	5	52	1	59	7	4	58	51	9	53
	+ 56	+ 9	+ 54	+ 8	+ 53	+ 55	+ 2	+ 6	+ 58	+ 9
	61	61	55	67	60	59	60	57	67	62
5.	3	27	36	45	3	8	2	95	38	7
	+ 13	+ 9	+ 3	+ 3	+ 57	+ 63	+ 89	+ 8	+ 3	+ 26
	16	36	39	48	60	71	91	103	41	33
6.	5	51	2	17	9	38	4	57	9	47
	+ 46	+ 1	+ 65	+ 8	+ 24	+ 7	+ 43	+ 6	+ 75	+ 6
	51	52	67	25	33	45	47	63	84	53
7.	62	66	7	4	69	64	3	5	64	68
	+ 1	+ 6	+ 61	+ 67	+ 9	+ 2	+ 68	+ 65	+ 6	+ 6
	63	72	68	71	78	66	71	70	70	74

If you have less than 56 correct, see your instructor for additional help.

Activity 4 - Adding Whole Numbers

(6) Directions: Add.

1.

25	8	49	6	63	2	12	5	39	7
+ 1	+ 31	+ 7	+ 58	+ 4	+ 77	+ 9	+ 28	+ 6	+ 38
26	39	56	64	67	79	21	33	45	45

2.

6	72	76	9	4	77	88	8	9	6
+ 75	+ 2	+ 7	+ 73	+ 78	+ 5	+ 5	+ 86	+ 84	+ 45
81	74	83	82	82	82	93	94	93	51

3.

11	26	32	47	53	64	79	85	96	37
+ 9	+ 7	+ 5	+ 8	+ 6	+ 4	+ 3	+ 1	+ 2	+ 5
20	33	37	55	59	68	82	86	98	42

4.

87	7	4	9	99	93	97	6	5	7
+ 6	+ 85	+ 92	+ 96	+ 3	+ 2	+ 7	+ 98	+ 98	+ 96
93	92	96	105	102	95	104	104	103	103

5.

4	2	3	1	8	7	5	6	9	8
+ 15	+ 21	+ 39	+ 44	+ 55	+ 68	+ 71	+ 81	+ 89	+ 46
19	23	42	45	63	75	76	87	98	54

6.

23	9	42	7	69	8	97	9	9	97
+ 6	+ 34	+ 7	+ 59	+ 4	+ 77	+ 5	+ 95	+ 88	+ 9
29	43	49	66	73	85	102	104	97	106

7.

1	5	2	3	6	5	2	9	8	6
30	47	81	25	52	83	56	37	36	84
+ 9	+ 8	+ 5	+ 6	+ 9	+ 4	+ 5	+ 8	+ 7	+ 5
40	60	88	34	67	92	63	54	51	95

If you have less than 56 correct, see your instructor for additional help.

Activity 4 - Adding Whole Numbers

(7) Rows 1 - 5 Directions: Add and check.

$$\begin{array}{lrrrr} 1. & 38 & 57 & 45 & 32 \\ & +\ 21 & +\ 32 & +\ 3 & +\ 25 \\ \cline{2-5} & 113 & 144 & 98 & 64 \end{array}$$

$$\begin{array}{lrrrr} 2. & 28 & 83 & 37 & 29 \\ & +\ 49 & +\ 46 & +\ 86 & +\ 45 \\ \cline{2-5} & 66 & 118 & 76 & 100 \end{array}$$

$$\begin{array}{lrrrr} 3. & 68 & 56 & 64 & 39 \\ & +\ 49 & +\ 71 & +\ 28 & +\ 42 \\ \cline{2-5} & 92 & 111 & 152 & 105 \end{array}$$

$$\begin{array}{lrrrr} 4. & 37 & 59 & 83 & 55 \\ & +\ 22 & +\ 76 & +\ 24 & +\ 99 \\ \cline{2-5} & 153 & 131 & 68 & 97 \end{array}$$

$$\begin{array}{lrrrr} 5. & 93 & 26 & 29 & 53 \\ & +\ 14 & +\ 53 & +\ 84 & +\ 28 \\ \cline{2-5} & 141 & 65 & 121 & 112 \end{array}$$

If you have less than 16 correct, see your instructor for additional help.

Activity 4 - Adding Whole Numbers

(7) Rows 6 - 10 Directions: Add and check.

6.
$$\begin{array}{r} 42 \\ +\ 54 \\ \hline 113 \end{array} \qquad \begin{array}{r} 34 \\ +\ 28 \\ \hline 144 \end{array} \qquad \begin{array}{r} 37 \\ +\ 61 \\ \hline 98 \end{array} \qquad \begin{array}{r} 24 \\ +\ 13 \\ \hline 64 \end{array}$$

7.
$$\begin{array}{r} 28 \\ +\ 73 \\ \hline 66 \end{array} \qquad \begin{array}{r} 53 \\ +\ 68 \\ \hline 118 \end{array} \qquad \begin{array}{r} 67 \\ +\ 31 \\ \hline 76 \end{array} \qquad \begin{array}{r} 13 \\ +\ 78 \\ \hline 100 \end{array}$$

8.
$$\begin{array}{r} 31 \\ +\ 28 \\ \hline 92 \end{array} \qquad \begin{array}{r} 93 \\ +\ 15 \\ \hline 111 \end{array} \qquad \begin{array}{r} 59 \\ +\ 83 \\ \hline 152 \end{array} \qquad \begin{array}{r} 82 \\ +\ 71 \\ \hline 105 \end{array}$$

9.
$$\begin{array}{r} 47 \\ +\ 26 \\ \hline 153 \end{array} \qquad \begin{array}{r} 93 \\ +\ 28 \\ \hline 131 \end{array} \qquad \begin{array}{r} 66 \\ +\ 32 \\ \hline 68 \end{array} \qquad \begin{array}{r} 28 \\ +\ 48 \\ \hline 97 \end{array}$$

10.
$$\begin{array}{r} 65 \\ +\ 27 \\ \hline 141 \end{array} \qquad \begin{array}{r} 47 \\ +\ 68 \\ \hline 65 \end{array} \qquad \begin{array}{r} 74 \\ +\ 16 \\ \hline 121 \end{array} \qquad \begin{array}{r} 55 \\ +\ 29 \\ \hline 112 \end{array}$$

If you have less than 16 correct, see your instructor for additional help.

Activity 4 - Adding Whole Numbers

(7) Rows 11 - 15 Directions: Add and check.

11.	$\begin{array}{r} 84 \\ +\ 29 \\ \hline 113 \end{array}$	$\begin{array}{r} 55 \\ +\ 89 \\ \hline 144 \end{array}$	$\begin{array}{r} 83 \\ +\ 15 \\ \hline 98 \end{array}$	$\begin{array}{r} 25 \\ +\ 39 \\ \hline 64 \end{array}$
12.	$\begin{array}{r} 19 \\ +\ 47 \\ \hline 66 \end{array}$	$\begin{array}{r} 82 \\ +\ 36 \\ \hline 118 \end{array}$	$\begin{array}{r} 31 \\ +\ 45 \\ \hline 76 \end{array}$	$\begin{array}{r} 74 \\ +\ 26 \\ \hline 100 \end{array}$
13.	$\begin{array}{r} 64 \\ +\ 28 \\ \hline 92 \end{array}$	$\begin{array}{r} 23 \\ +\ 88 \\ \hline 111 \end{array}$	$\begin{array}{r} 65 \\ +\ 87 \\ \hline 152 \end{array}$	$\begin{array}{r} 56 \\ +\ 49 \\ \hline 105 \end{array}$
14.	$\begin{array}{r} 75 \\ +\ 78 \\ \hline 153 \end{array}$	$\begin{array}{r} 43 \\ +\ 88 \\ \hline 131 \end{array}$	$\begin{array}{r} 39 \\ +\ 29 \\ \hline 68 \end{array}$	$\begin{array}{r} 74 \\ +\ 23 \\ \hline 97 \end{array}$
15.	$\begin{array}{r} 98 \\ +\ 43 \\ \hline 141 \end{array}$	$\begin{array}{r} 39 \\ +\ 26 \\ \hline 65 \end{array}$	$\begin{array}{r} 93 \\ +\ 28 \\ \hline 121 \end{array}$	$\begin{array}{r} 96 \\ +\ 16 \\ \hline 112 \end{array}$

If you have less than 16 correct, see your instructor for additional help.

Activity 4 - Adding Whole Numbers

(7) Rows 16 - 20 Directions: Add and check.

$$16.\quad \begin{array}{r}66\\+\ 45\\\hline 111\end{array}\qquad \begin{array}{r}24\\+\ 63\\\hline 87\end{array}\qquad \begin{array}{r}57\\+\ 14\\\hline 71\end{array}\qquad \begin{array}{r}92\\+\ 79\\\hline 171\end{array}$$

$$17.\quad \begin{array}{r}61\\+\ 26\\\hline 87\end{array}\qquad \begin{array}{r}65\\+\ 27\\\hline 92\end{array}\qquad \begin{array}{r}48\\+\ 56\\\hline 104\end{array}\qquad \begin{array}{r}14\\+\ 2\\\hline 16\end{array}$$

$$18.\quad \begin{array}{r}32\\+\ 19\\\hline 51\end{array}\qquad \begin{array}{r}39\\+\ 87\\\hline 126\end{array}\qquad \begin{array}{r}29\\+\ 50\\\hline 79\end{array}\qquad \begin{array}{r}47\\+\ 24\\\hline 71\end{array}$$

$$19.\quad \begin{array}{r}13\\+\ 41\\\hline 54\end{array}\qquad \begin{array}{r}59\\+\ 26\\\hline 85\end{array}\qquad \begin{array}{r}25\\+\ 3\\\hline 28\end{array}\qquad \begin{array}{r}17\\+\ 79\\\hline 96\end{array}$$

$$20.\quad \begin{array}{r}72\\+\ 24\\\hline 96\end{array}\qquad \begin{array}{r}44\\+\ 36\\\hline 80\end{array}\qquad \begin{array}{r}46\\+\ 2\\\hline 48\end{array}\qquad \begin{array}{r}38\\+\ 25\\\hline 63\end{array}$$

If you have less than 16 correct, see your instructor for additional help.

Activity 4 - Adding Whole Numbers

(8) **Rows 1- 5** Directions: Add and check.

1.	$\begin{array}{r} 78 \\ +\ 25 \\ \hline 103 \end{array}$	$\begin{array}{r} 37 \\ +\ 69 \\ \hline 106 \end{array}$	$\begin{array}{r} 82 \\ +\ 14 \\ \hline 96 \end{array}$
2.	$\begin{array}{r} 59 \\ +\ 67 \\ \hline 126 \end{array}$	$\begin{array}{r} 32 \\ +\ 49 \\ \hline 81 \end{array}$	$\begin{array}{r} 55 \\ +\ 63 \\ \hline 118 \end{array}$
3.	$\begin{array}{r} 23 \\ +\ 89 \\ \hline 112 \end{array}$	$\begin{array}{r} 74 \\ +\ 25 \\ \hline 99 \end{array}$	$\begin{array}{r} 93 \\ +\ 25 \\ \hline 118 \end{array}$
4.	$\begin{array}{r} 61 \\ +\ 28 \\ \hline 89 \end{array}$	$\begin{array}{r} 24 \\ +\ 57 \\ \hline 81 \end{array}$	$\begin{array}{r} 28 \\ +\ 16 \\ \hline 44 \end{array}$
5.	$\begin{array}{r} 54 \\ +\ 78 \\ \hline 132 \end{array}$	$\begin{array}{r} 69 \\ +\ 23 \\ \hline 92 \end{array}$	$\begin{array}{r} 51 \\ +\ 28 \\ \hline 79 \end{array}$

If you have less than 12 correct, see your instructor for additional help.

Activity 4 - Adding Whole Numbers

(8) **Rows 6 - 10** Directions: Add and check.

6. $\begin{array}{r} 73 \\ +\ 69 \\ \hline 142 \end{array}$ $\qquad$ $\begin{array}{r} 84 \\ +\ 28 \\ \hline 112 \end{array}$ $\qquad$ $\begin{array}{r} 62 \\ +\ 48 \\ \hline 110 \end{array}$

7. $\begin{array}{r} 87 \\ +\ 91 \\ \hline 178 \end{array}$ $\qquad$ $\begin{array}{r} 48 \\ +\ 26 \\ \hline 74 \end{array}$ $\qquad$ $\begin{array}{r} 53 \\ +\ 97 \\ \hline 150 \end{array}$

8. $\begin{array}{r} 68 \\ +\ 54 \\ \hline 122 \end{array}$ $\qquad$ $\begin{array}{r} 83 \\ +\ 17 \\ \hline 100 \end{array}$ $\qquad$ $\begin{array}{r} 75 \\ +\ 29 \\ \hline 104 \end{array}$

9. $\begin{array}{r} 74 \\ +\ 28 \\ \hline 102 \end{array}$ $\qquad$ $\begin{array}{r} 68 \\ +\ 93 \\ \hline 161 \end{array}$ $\qquad$ $\begin{array}{r} 95 \\ +\ 82 \\ \hline 177 \end{array}$

10. $\begin{array}{r} 46 \\ +\ 83 \\ \hline 129 \end{array}$ $\qquad$ $\begin{array}{r} 72 \\ +\ 96 \\ \hline 168 \end{array}$ $\qquad$ $\begin{array}{r} 47 \\ +\ 84 \\ \hline 131 \end{array}$

If you have less than 12 correct, see your instructor for additional help.

Activity 4 - Adding Whole Numbers

(8) **Rows 11 - 15** Directions: Add and check.

11.	92	73	29	34
	+ 15	+ 16	+ 33	+ 69
	107	89	62	103
12.	45	63	37	84
	+ 57	+ 98	+ 69	+ 57
	102	161	106	141
13.	36	24	71	64
	+ 83	+ 47	+ 98	+ 36
	119	71	169	100
14.	49	63	62	65
	+ 87	+ 29	+ 79	+ 97
	136	92	141	162
15.	26	38	83	58
	+ 75	+ 44	+ 29	+ 46
	101	82	112	104

If you have less than 16 correct, see your instructor for additional help.

Activity 4 - Adding Whole Numbers

(9) Directions: Add and check.

1.	$\begin{array}{r} 68 \\ +\ 580 \\ \hline 648 \end{array}$	$\begin{array}{r} 72 \\ +\ 469 \\ \hline 541 \end{array}$	$\begin{array}{r} 93 \\ +\ 708 \\ \hline 801 \end{array}$	$\begin{array}{r} 87 \\ +\ 506 \\ \hline 593 \end{array}$
2.	$\begin{array}{r} 748 \\ +\ 87 \\ \hline 835 \end{array}$	$\begin{array}{r} 825 \\ +\ 59 \\ \hline 884 \end{array}$	$\begin{array}{r} 346 \\ +\ 64 \\ \hline 410 \end{array}$	$\begin{array}{r} 293 \\ +\ 53 \\ \hline 346 \end{array}$
3.	$\begin{array}{r} 41 \\ +\ 289 \\ \hline 330 \end{array}$	$\begin{array}{r} 57 \\ +\ 418 \\ \hline 475 \end{array}$	$\begin{array}{r} 53 \\ +\ 469 \\ \hline 522 \end{array}$	$\begin{array}{r} 64 \\ +\ 377 \\ \hline 441 \end{array}$
4.	$\begin{array}{r} 302 \\ +\ 83 \\ \hline 385 \end{array}$	$\begin{array}{r} 729 \\ +\ 50 \\ \hline 779 \end{array}$	$\begin{array}{r} 655 \\ +\ 43 \\ \hline 698 \end{array}$	

If you have less than 12 correct, see your instructor for additional help.

Activity 4 - Adding Whole Numbers

(10) Directions: Add and check.

1.
$$\begin{array}{r} 56 \\ +\ 811 \\ \hline 867 \end{array} \qquad \begin{array}{r} 34 \\ +\ 205 \\ \hline 239 \end{array} \qquad \begin{array}{r} 80 \\ +\ 709 \\ \hline 789 \end{array} \qquad \begin{array}{r} 482 \\ +\ 16 \\ \hline 498 \end{array}$$

2.
$$\begin{array}{r} 314 \\ +\ 98 \\ \hline 412 \end{array} \qquad \begin{array}{r} 283 \\ +\ 56 \\ \hline 339 \end{array} \qquad \begin{array}{r} 607 \\ +\ 95 \\ \hline 702 \end{array} \qquad \begin{array}{r} 966 \\ +\ 35 \\ \hline 1{,}001 \end{array}$$

3.
$$\begin{array}{r} 53 \\ +\ 436 \\ \hline 489 \end{array} \qquad \begin{array}{r} 13 \\ +\ 206 \\ \hline 219 \end{array} \qquad \begin{array}{r} 62 \\ +\ 914 \\ \hline 976 \end{array} \qquad \begin{array}{r} 47 \\ +\ 532 \\ \hline 579 \end{array}$$

4.
$$\begin{array}{r} 946 \\ +\ 32 \\ \hline 978 \end{array} \qquad \begin{array}{r} 415 \\ +\ 61 \\ \hline 476 \end{array} \qquad \begin{array}{r} 723 \\ +\ 75 \\ \hline 798 \end{array}$$

If you have less than 12 correct, see your instructor for additional help.

Activity 4 - Adding Whole Numbers

(11) Directions: Add and check.

1.
$$\begin{array}{r} 66 \\ 81 \\ +\ 56 \\ \hline 203 \end{array} \qquad \begin{array}{r} 21 \\ 49 \\ +\ 43 \\ \hline 113 \end{array} \qquad \begin{array}{r} 89 \\ 67 \\ +\ 50 \\ \hline 206 \end{array} \qquad \begin{array}{r} 92 \\ 10 \\ +\ 39 \\ \hline 141 \end{array}$$

2.
$$\begin{array}{r} 87 \\ 19 \\ +\ 72 \\ \hline 178 \end{array} \qquad \begin{array}{r} 60 \\ 54 \\ +\ 38 \\ \hline 152 \end{array} \qquad \begin{array}{r} 31 \\ 28 \\ +\ 44 \\ \hline 103 \end{array} \qquad \begin{array}{r} 79 \\ 96 \\ +\ 83 \\ \hline 258 \end{array}$$

3.
$$\begin{array}{r} 70 \\ 57 \\ +\ 202 \\ \hline 329 \end{array} \qquad \begin{array}{r} 51 \\ 91 \\ +\ 329 \\ \hline 471 \end{array} \qquad \begin{array}{r} 42 \\ 93 \\ +\ 516 \\ \hline 651 \end{array} \qquad \begin{array}{r} 78 \\ 12 \\ +\ 490 \\ \hline 580 \end{array}$$

4.
$$\begin{array}{r} 63 \\ 85 \\ +\ 854 \\ \hline 1{,}002 \end{array} \qquad \begin{array}{r} 84 \\ 43 \\ +\ 977 \\ \hline 1{,}104 \end{array} \qquad \begin{array}{r} 20 \\ 74 \\ +\ 627 \\ \hline 721 \end{array} \qquad \begin{array}{r} 95 \\ 80 \\ +\ 417 \\ \hline 592 \end{array}$$

If you have less than 13 correct, see your instructor for additional help.

Activity 4 - Adding Whole Numbers

(12) Directions: Add and check.

$$\begin{array}{lrrr}
1. & 91 & 15 & 23 \\
 & 31 & 75 & 22 \\
 & 78 & 76 & 87 \\
 & +\ 66 & +\ 31 & +\ 99 \\
\cline{2-4}
 & 266 & 197 & 231
\end{array}$$

$$\begin{array}{lrrr}
2. & 646 & 930 & 347 \\
 & 60 & 15 & 38 \\
 & 52 & 37 & 67 \\
 & +\ 944 & +\ 376 & +\ 421 \\
\cline{2-4}
 & 1{,}702 & 1{,}358 & 873
\end{array}$$

$$\begin{array}{lrrr}
3. & 94 & 40 & 27 \\
 & 21 & 83 & 40 \\
 & 39 & 26 & 67 \\
 & 45 & 29 & 28 \\
 & +\ 80 & +\ 33 & +\ 86 \\
\cline{2-4}
 & 279 & 211 & 248
\end{array}$$

$$\begin{array}{lrrr}
4. & 57 & 43 & 86 \\
 & 35 & 51 & 65 \\
 & 12 & 74 & 84 \\
 & 83 & 32 & 46 \\
 & +\ 58 & +\ 36 & +\ 97 \\
\cline{2-4}
 & 245 & 236 & 378
\end{array}$$

If you have less than 10 correct, see your instructor for additional help.

Activity 4 - Adding Whole Numbers

(13) **Rows 1 - 5** Directions: Add and check.

1. $$\begin{array}{r} 603 \\ +\ 285 \\ \hline 888 \end{array} \qquad \begin{array}{r} 577 \\ +\ 321 \\ \hline 898 \end{array} \qquad \begin{array}{r} 458 \\ +\ 201 \\ \hline 659 \end{array} \qquad \begin{array}{r} 413 \\ +\ 564 \\ \hline 977 \end{array}$$

2. $$\begin{array}{r} 805 \\ +\ 163 \\ \hline 968 \end{array} \qquad \begin{array}{r} 761 \\ +\ 135 \\ \hline 896 \end{array} \qquad \begin{array}{r} 432 \\ +\ 245 \\ \hline 677 \end{array} \qquad \begin{array}{r} 854 \\ +\ 133 \\ \hline 987 \end{array}$$

3. $$\begin{array}{r} 345 \\ +\ 698 \\ \hline 1{,}043 \end{array} \qquad \begin{array}{r} 254 \\ +\ 736 \\ \hline 990 \end{array} \qquad \begin{array}{r} 829 \\ +\ 847 \\ \hline 1{,}676 \end{array} \qquad \begin{array}{r} 378 \\ +\ 692 \\ \hline 1{,}070 \end{array}$$

4. $$\begin{array}{r} 748 \\ +\ 642 \\ \hline 1{,}390 \end{array} \qquad \begin{array}{r} 293 \\ +\ 718 \\ \hline 1{,}011 \end{array} \qquad \begin{array}{r} 786 \\ +\ 692 \\ \hline 1{,}478 \end{array} \qquad \begin{array}{r} 267 \\ +\ 541 \\ \hline 808 \end{array}$$

5. $$\begin{array}{r} 843 \\ +\ 927 \\ \hline 1{,}770 \end{array} \qquad \begin{array}{r} 298 \\ +\ 354 \\ \hline 652 \end{array} \qquad \begin{array}{r} 674 \\ +\ 732 \\ \hline 1{,}406 \end{array} \qquad \begin{array}{r} 235 \\ +\ 872 \\ \hline 1{,}107 \end{array}$$

If you have less than 16 correct, see your instructor for additional help.

Activity 4 - Adding Whole Numbers

(13) **Rows 6 - 10** Directions: Add and check.

$$\begin{array}{lrrrrr} 6. & 762 & 210 & 307 & 386 & 138 \\ & +\ 125 & +\ 648 & +\ 652 & +\ 402 & +\ 844 \\ \cline{2-6} & 887 & 858 & 959 & 788 & 982 \end{array}$$

$$\begin{array}{lrrrrr} 7. & 328 & 415 & 574 & 925 & 558 \\ & +\ 560 & +\ 383 & +\ 692 & +\ 381 & +\ 649 \\ \cline{2-6} & 888 & 798 & 1{,}266 & 1{,}306 & 1{,}207 \end{array}$$

$$\begin{array}{lrrrrr} 8. & 493 & 254 & 368 & 758 & 423 \\ & +\ 386 & +\ 255 & +\ 645 & +\ 452 & +\ 468 \\ \cline{2-6} & 879 & 509 & 1{,}013 & 1{,}210 & 891 \end{array}$$

$$\begin{array}{lrrrr} 9. & 475 & 347 & 425 & 129 \\ & +\ 321 & +\ 433 & +\ 716 & +\ 632 \\ \cline{2-5} & 796 & 780 & 1{,}141 & 761 \end{array}$$

$$\begin{array}{lrrrr} 10. & 328 & 523 & 215 & 548 \\ & +\ 972 & +\ 476 & +\ 256 & +\ 627 \\ \cline{2-5} & 1{,}300 & 999 & 471 & 1{,}175 \end{array}$$

If you have less than 18 correct, see your instructor for additional help.

Activity 4 - Adding Whole Numbers

(14) **Rows 1 - 5** Directions: Add and check.

1.	786 + 394 1,180	928 + 782 1,710	475 + 698 1,173	378 + 257 635
2.	378 + 269 647	543 + 786 1,329	834 + 729 1,563	541 + 269 810
3.	287 + 465 752	387 + 298 685	546 + 589 1,135	728 + 569 1,297
4.	384 + 429 813	968 + 518 1,486	652 + 478 1,130	409 + 583 992
5.	740 + 893 1,633	584 + 427 1,011	637 + 905 1,542	842 + 369 1,211

If you have less than 16 correct, see your instructor for additional help.

Activity 4 - Adding Whole Numbers

(14) **Rows 6 - 11** Directions: Add and check.

6.	$\begin{array}{r} 683 \\ +\ 417 \\ \hline 1{,}100 \end{array}$	$\begin{array}{r} 257 \\ +\ 683 \\ \hline 940 \end{array}$	$\begin{array}{r} 594 \\ +\ 417 \\ \hline 1{,}011 \end{array}$	$\begin{array}{r} 267 \\ +\ 936 \\ \hline 1{,}203 \end{array}$
7.	$\begin{array}{r} 405 \\ +\ 561 \\ \hline 966 \end{array}$	$\begin{array}{r} 216 \\ +\ 423 \\ \hline 639 \end{array}$	$\begin{array}{r} 537 \\ +\ 252 \\ \hline 789 \end{array}$	$\begin{array}{r} 640 \\ +\ 118 \\ \hline 758 \end{array}$
8.	$\begin{array}{r} 689 \\ +\ 836 \\ \hline 1{,}525 \end{array}$	$\begin{array}{r} 546 \\ +\ 921 \\ \hline 1{,}467 \end{array}$	$\begin{array}{r} 786 \\ +\ 293 \\ \hline 1{,}079 \end{array}$	$\begin{array}{r} 548 \\ +\ 687 \\ \hline 1{,}235 \end{array}$
9.	$\begin{array}{r} 834 \\ +\ 785 \\ \hline 1{,}619 \end{array}$	$\begin{array}{r} 692 \\ +\ 847 \\ \hline 1{,}539 \end{array}$	$\begin{array}{r} 716 \\ +\ 263 \\ \hline 979 \end{array}$	$\begin{array}{r} 408 \\ +\ 241 \\ \hline 649 \end{array}$
10.	$\begin{array}{r} 715 \\ +\ 486 \\ \hline 1{,}201 \end{array}$	$\begin{array}{r} 709 \\ +\ 983 \\ \hline 1{,}692 \end{array}$	$\begin{array}{r} 607 \\ +\ 406 \\ \hline 1{,}013 \end{array}$	$\begin{array}{r} 219 \\ +\ 389 \\ \hline 608 \end{array}$
11.	$\begin{array}{r} 885 \\ +\ 102 \\ \hline 987 \end{array}$	$\begin{array}{r} 235 \\ +\ 452 \\ \hline 687 \end{array}$		

If you have less than 18 correct, see your instructor for additional help.

Activity 4 - Adding Whole Numbers

(15) Directions: Add and check.

1.

$$\begin{array}{r} 547 \\ +\ 6,151 \\ \hline 6,698 \end{array} \qquad \begin{array}{r} 296 \\ +\ 4,203 \\ \hline 4,499 \end{array} \qquad \begin{array}{r} 638 \\ +\ 5,141 \\ \hline 5,779 \end{array}$$

2.

$$\begin{array}{r} 9,348 \\ +\ 341 \\ \hline 9,689 \end{array} \qquad \begin{array}{r} 2,416 \\ +\ 502 \\ \hline 2,918 \end{array} \qquad \begin{array}{r} 3,468 \\ +\ 330 \\ \hline 3,798 \end{array}$$

3.

$$\begin{array}{r} 513 \\ +\ 6,256 \\ \hline 6,769 \end{array} \qquad \begin{array}{r} 704 \\ +\ 8,235 \\ \hline 8,939 \end{array} \qquad \begin{array}{r} 652 \\ +\ 3,144 \\ \hline 3,796 \end{array}$$

4.

$$\begin{array}{r} 3,224 \\ +\ 641 \\ \hline 3,865 \end{array} \qquad \begin{array}{r} 7,152 \\ +\ 807 \\ \hline 7,959 \end{array} \qquad \begin{array}{r} 8,210 \\ +\ 326 \\ \hline 8,536 \end{array}$$

If you have less than 10 correct, see your instructor for additional help.

Activity 4 - Adding Whole Numbers

(16) Directions: Add and check.

1.	146	243	880
	73	10	77
	+ 718	+ 256	+ 523
	937	509	1,480

2.	367	236	413	223
	520	153	648	209
	+ 124	+ 875	+ 381	+ 574
	1,011	1,264	1,442	1,006

3.	175	357	526	162	845
	263	113	683	842	464
	+ 421	+ 318	+ 347	+ 682	+ 573
	859	788	1,556	1,686	1,882

4.	316	214	817	552	621
	470	275	646	673	897
	+ 211	+ 463	+ 373	+ 631	+ 973
	997	952	1,836	1,856	2,491

If you have less than 14 correct, see your instructor for additional help.

Cluster
Applied Math

Activity 4 - Adding Whole Numbers

(17) Directions: Use your scratch paper to add these numbers.
Use your calculator to check your answers.

1.	685	597	263	760	461	298
	691	283	161	218	919	709
	274	406	247	322	653	395
	+ 394	+ 938	+ 459	+ 938	+ 597	+ 471
	2,044	2,224	1,130	2,238	2,630	1,873

2.	518	114	806	638	441
	782	726	992	793	348
	764	953	528	136	635
	207	199	666	483	914
	+ 843	+ 727	+ 894	+ 397	+ 679
	3,114	2,719	3,886	2,447	3,017

3.	272	944	357
	107	775	106
	814	753	197
	760	107	371
	591	779	810
	467	107	849
	157	811	693
	+ 724	+ 661	+ 556
	3,892	4,937	3,939

4.	494	165	618
	847	559	622
	511	428	159
	577	135	285
	905	650	341
	699	417	675
	359	505	662
	+ 424	+ 876	+ 996
	4,816	3,735	4,358

If you have less than 14 correct, see your instructor for additional help.

Activity 4 - Adding Whole Numbers

(18) Directions: Add and check.

1.
$$\begin{array}{rrr} 8,027 & 3,329 & 6,203 \\ +\ 1,932 & +\ 4,060 & +\ 2,351 \\ \hline 9,959 & 7,389 & 8,554 \end{array}$$

2.
$$\begin{array}{rrr} 6,001 & 2,347 & 7,580 \\ +\ 2,573 & +\ 2,412 & +\ 1,316 \\ \hline 8,574 & 4,759 & 8,896 \end{array}$$

3.
$$\begin{array}{rrr} 4,825 & 1,756 & 6,073 \\ +\ 3,034 & +\ 6,213 & +\ 2,515 \\ \hline 7,879 & 7,969 & 8,588 \end{array}$$

4.
$$\begin{array}{rrr} 4,815 & 8,047 & 1,966 \\ +\ 2,114 & +\ 1,832 & +\ 4,032 \\ \hline 6,929 & 9,879 & 5,998 \end{array}$$

5.
$$\begin{array}{rrr} 4,116 & 7,038 & 2,413 \\ +\ 4,572 & +\ 2,521 & +\ 4,334 \\ \hline 8,688 & 9,559 & 6,747 \end{array}$$

6.
$$\begin{array}{rrr} 4,261 & 2,352 & 7,084 \\ +\ 3,428 & +\ 6,043 & +\ 2,713 \\ \hline 7,689 & 8,395 & 9,797 \end{array}$$

If you have less than 14 correct, see your instructor for additional help.

Activity 4 - Adding Whole Numbers

(19) Directions: Add and check.

1. $\begin{array}{r} 7,244 \\ +\ 2,351 \\ \hline 9,595 \end{array}$ $\qquad$ $\begin{array}{r} 8,563 \\ +\ 1,234 \\ \hline 9,797 \end{array}$ $\qquad$ $\begin{array}{r} 5,042 \\ +\ 2,635 \\ \hline 7,677 \end{array}$

2. $\begin{array}{r} 4,162 \\ +\ 5,736 \\ \hline 9,898 \end{array}$ $\qquad$ $\begin{array}{r} 2,438 \\ +\ 4,235 \\ \hline 6,673 \end{array}$ $\qquad$ $\begin{array}{r} 7,654 \\ +\ 3,476 \\ \hline 11,130 \end{array}$

3. $\begin{array}{r} 4,651 \\ +\ 3,238 \\ \hline 7,889 \end{array}$ $\qquad$ $\begin{array}{r} 3,527 \\ +\ 1,417 \\ \hline 4,944 \end{array}$ $\qquad$ $\begin{array}{r} 6,355 \\ +\ 3,846 \\ \hline 10,201 \end{array}$

4. $\begin{array}{r} 7,136 \\ +\ 1,042 \\ \hline 8,178 \end{array}$ $\qquad$ $\begin{array}{r} 3,574 \\ +\ 3,103 \\ \hline 6,677 \end{array}$ $\qquad$ $\begin{array}{r} 5,546 \\ +\ 2,342 \\ \hline 7,888 \end{array}$

5. $\begin{array}{r} 2,746 \\ +\ 8,337 \\ \hline 11,803 \end{array}$ $\qquad$ $\begin{array}{r} 8,437 \\ +\ 5,895 \\ \hline 14,332 \end{array}$ $\qquad$ $\begin{array}{r} 4,825 \\ +\ 2,164 \\ \hline 6,989 \end{array}$

6. $\begin{array}{r} 9,223 \\ +\ 4,439 \\ \hline 13,662 \end{array}$ $\qquad$ $\begin{array}{r} 7,558 \\ +\ 6,796 \\ \hline 14,354 \end{array}$ $\qquad$ $\begin{array}{r} 3,251 \\ +\ 4,748 \\ \hline 7,999 \end{array}$

If you have less than 14 correct, see your instructor for additional help.

Activity 4 - Adding Whole Numbers

(20) Directions: Add and check.

1.	2,562	4,658	5,673
	3,114	3,226	2,225
	+ 3,201	+ 1,814	+ 3,070
	8,877	9,698	10,968
2.	4,124	2,543	7,338
	3,251	6,671	3,229
	+ 1,524	+ 1,187	+ 6,360
	8,899	10,401	16,927
3.	8,779	4,855	7,630
	2,286	2,849	4,108
	+ 5,269	+ 1,754	+ 7,068
	16,334	9,458	18,806
4.	8,493	4,181	4,596
	7,601	7,670	8,892
	+ 2,519	+ 2,892	+ 4,625
	18,613	14,743	18,113
5.	9,478	3,997	5,504
	6,791	9,254	2,741
	+ 5,912	+ 4,529	+ 3,116
	22,181	17,780	11,361

If you have less than 12 correct, see your instructor for additional help.

Activity 4 - Adding Whole Numbers

(21) Directions: Use scratch paper to add these numbers. Use your calculator to check your answer.

1.	3,948	6,787
	7,758	3,316
	6,799	4,213
	+ 2,437	+ 5,449
	20,942	19,765
2.	8,123	2,774
	7,510	7,887
	1,085	3,551
	6,534	4,560
	9,469	5,494
	3,638	1,745
	+ 1,086	+ 8,361
	37,445	34,372
3.	8,649	7,099
	7,856	9,592
	4,822	3,683
	4,776	9,971
	6,252	1,617
	2,791	2,193
	+ 8,679	+ 8,062
	43,825	42,217
4.	4,108	9,081
	7,915	8,752
	3,736	2,978
	+ 2,615	+ 7,093
	18,374	27,904

If you have less than 6 correct, see your instructor for additional help.

Activity 4 - Adding Whole Numbers

(22) Directions: Add and check.

1.
$$\begin{array}{r} 24{,}207 \\ +\ 15{,}072 \\ \hline 39{,}279 \end{array} \qquad \begin{array}{r} 54{,}156 \\ +\ 30{,}422 \\ \hline 84{,}578 \end{array} \qquad \begin{array}{r} 32{,}854 \\ +\ 43{,}104 \\ \hline 75{,}958 \end{array}$$

2.
$$\begin{array}{r} 14{,}871 \\ +\ 65{,}118 \\ \hline 79{,}989 \end{array} \qquad \begin{array}{r} 75{,}854 \\ +\ 24{,}357 \\ \hline 100{,}211 \end{array} \qquad \begin{array}{r} 40{,}955 \\ +\ 46{,}365 \\ \hline 87{,}320 \end{array}$$

3.
$$\begin{array}{r} 36{,}745 \\ +\ 42{,}031 \\ \hline 78{,}776 \end{array} \qquad \begin{array}{r} 56{,}092 \\ +\ 23{,}805 \\ \hline 79{,}897 \end{array} \qquad \begin{array}{r} 72{,}033 \\ +\ 21{,}563 \\ \hline 93{,}596 \end{array}$$

4.
$$\begin{array}{r} 51{,}084 \\ +\ 27{,}505 \\ \hline 78{,}589 \end{array} \qquad \begin{array}{r} 69{,}043 \\ +\ 20{,}516 \\ \hline 89{,}559 \end{array} \qquad \begin{array}{r} 23{,}864 \\ +\ 51{,}133 \\ \hline 74{,}997 \end{array}$$

5.
$$\begin{array}{r} 25{,}401 \\ +\ 22{,}367 \\ \hline 47{,}768 \end{array} \qquad \begin{array}{r} 86{,}996 \\ +\ 97{,}668 \\ \hline 184{,}664 \end{array} \qquad \begin{array}{r} 27{,}514 \\ +\ 22{,}384 \\ \hline 49{,}898 \end{array}$$

If you have less than 12 correct, see your instructor for additional help.

Activity 4 - Adding Whole Numbers

(23) Directions: Add and check.

1.

$$\begin{array}{rrr} 21{,}513 & 63{,}285 & 32{,}643 \\ +\ 62{,}375 & +\ 24{,}926 & +\ 20{,}898 \\ \hline 83{,}888 & 88{,}211 & 53{,}541 \end{array}$$

2.

$$\begin{array}{rrr} 18{,}946 & 70{,}128 & 54{,}223 \\ +\ 51{,}032 & +\ 16{,}641 & +\ 32{,}564 \\ \hline 69{,}978 & 86{,}769 & 86{,}787 \end{array}$$

3.

$$\begin{array}{rrr} 51{,}937 & 69{,}821 & 30{,}649 \\ +\ 35{,}042 & +\ 20{,}104 & +\ 54{,}320 \\ \hline 86{,}979 & 89{,}925 & 84{,}969 \end{array}$$

4.

$$\begin{array}{rrr} 58{,}971 & 72{,}064 & 38{,}684 \\ +\ 28{,}099 & +\ 27{,}248 & +\ 20{,}314 \\ \hline 87{,}070 & 99{,}312 & 58{,}998 \end{array}$$

5.

$$\begin{array}{r} 76{,}521 \\ +\ 13{,}054 \\ \hline 89{,}575 \end{array}$$

If you have less than 10 correct, see your instructor for additional help.

Activity 4 - Adding Whole Numbers

(24) Directions: Add and check.

1.	52,364	35,086	20,316
	+ 2,305	+ 1,213	+ 8,271
	54,669	36,299	28,587
2.	86,954	29,847	59,146
	21,326	31,866	28,759
	+ 40,579	+ 49,230	+ 61,238
	148,859	110,943	149,143
3.	76,493	44,538	27,881
	66,590	64,908	92,855
	+ 27,286	+ 70,435	+ 33,064
	170,369	179,881	153,800
4.	43,972	69,836	75,634
	61,258	71,234	32,408
	+ 30,417	+ 33,927	+ 21,046
	135,647	174,997	129,088
5.	27,290	+ 54,763	
	+ 2,607	4,134	
	29,897	58,897	

If you have less than 11 correct, see your instructor for additional help.

Activity 4 - Adding Whole Numbers

(25) Directions: Add and check.

1.
$$\begin{array}{rrr} 392{,}844 & 693{,}295 & 476{,}698 \\ +\ 547{,}276 & +\ 248{,}708 & +\ 781{,}786 \\ \hline 940{,}120 & 942{,}003 & 1{,}258{,}484 \end{array}$$

2.
$$\begin{array}{rrr} 646{,}245 & 665{,}014 & 236{,}980 \\ +\ 695{,}048 & +\ 959{,}084 & +\ 346{,}706 \\ \hline 1{,}341{,}293 & 1{,}624{,}098 & 583{,}686 \end{array}$$

3.
$$\begin{array}{rrr} 683{,}945 & 382{,}769 & 473{,}586 \\ +\ 821{,}596 & +\ 737{,}892 & +\ 469{,}218 \\ \hline 1{,}505{,}541 & 1{,}120{,}661 & 942{,}804 \end{array}$$

4.
$$\begin{array}{rrr} 596{,}868 & 998{,}273 & 610{,}199 \\ +\ 243{,}117 & +\ 289{,}713 & +\ 583{,}045 \\ \hline 839{,}985 & 1{,}287{,}986 & 1{,}193{,}244 \end{array}$$

5.
$$\begin{array}{r} 592{,}768 \\ +\ 409{,}826 \\ \hline 1{,}002{,}594 \end{array}$$

If you have less than 10 correct, see your instructor for additional help.

Activity 4 - Adding Whole Numbers

(26) Directions: Add and check.

1.

$$\begin{array}{r} 642{,}865 \\ +\ 921{,}565 \\ \hline 1{,}564{,}430 \end{array} \qquad \begin{array}{r} 784{,}228 \\ +\ 843{,}627 \\ \hline 1{,}627{,}855 \end{array} \qquad \begin{array}{r} 372{,}486 \\ +\ 687{,}769 \\ \hline 1{,}060{,}255 \end{array}$$

2.

$$\begin{array}{r} 662{,}184 \\ +\ 234{,}013 \\ \hline 896{,}197 \end{array} \qquad \begin{array}{r} 729{,}832 \\ +\ 240{,}144 \\ \hline 969{,}976 \end{array} \qquad \begin{array}{r} 229{,}056 \\ +\ 500{,}832 \\ \hline 729{,}888 \end{array}$$

3.

$$\begin{array}{r} 367{,}455 \\ +\ 422{,}301 \\ \hline 789{,}756 \end{array} \qquad \begin{array}{r} 294{,}391 \\ +\ 748{,}692 \\ \hline 1{,}043{,}083 \end{array} \qquad \begin{array}{r} 249{,}382 \\ +\ 389{,}827 \\ \hline 639{,}209 \end{array}$$

4.

$$\begin{array}{r} 831{,}476 \\ +\ 978{,}937 \\ \hline 1{,}810{,}413 \end{array} \qquad \begin{array}{r} 210{,}976 \\ +\ 384{,}012 \\ \hline 594{,}988 \end{array} \qquad \begin{array}{r} 861{,}042 \\ +\ 121{,}446 \\ \hline 982{,}488 \end{array}$$

5.

$$\begin{array}{r} 478{,}695 \\ +\ 341{,}217 \\ \hline 819{,}912 \end{array}$$

If you have less than 10 correct, see your instructor for additional help.

Cluster
Applied Math

Activity 4 - Adding Whole Numbers

(27) Directions:

1.	423,876,982 + 839,213,469 1,263,090,451	476,827,698 + 928,022,809 1,404,850,507	247,692,385 + 786,427,820 1,034,120,205
2.	738,925,467 + 426,178,698 1,165,104,165	293,847,693 + 542,769,827 836,617,520	786,925,478 + 354,769,842 1,141,695,320
3.	742,618,726 + 427,864,415 1,170,483,141	427,893,876 + 738,264,699 1,166,158,575	924,647,822 + 376,256,878 1,300,904,700
4.	725,678,296 + 854,927,707 1,580,606,003	537,698,276 + 654,276,987 1,191,975,263	547,692,859 + 382,769,842 930,462,701

If you have less than 10 correct, see your instructor for additional help.

Activity 5 - Solving Word Problems

1. 548 cartons
2. 275 miles
3. $ 3.53
4. 72 gallons
5. 528 pounds
6. 841 employees
7. 5,672,199 crackers
8. 9,400,000 cookies and crackers
9. 1,976 pounds
10. 2,824 bundles
11. 118 units
12. 28,354 units
13. 6:55 p.m.
14. $ 2.70
15. 2,663 boxes
16. 118,840 pounds
17. 1,285.5 grams
18. 1,479 pounds
19. 1,818 doughs
20. Shift 1: 643
    Shift 2: 376 Cumulative total = 1,019
    Shift 3: 485 Cumulative total = 1,504
21. Shift 1: 5,432
    Shift 2: 4,987 Cumulative total = 10,419
    Shift 3: 5,321 Cumulative total = 15,740
22. 81.98 net weight

If you have less than 18 correct, see your instructor for additional help.

Activity 6 - Subtracting Whole Numbers

(1) Directions: Subtract.

1.

$$\begin{array}{r} 8 \\ -\ 4 \\ \hline 4 \end{array} \quad \begin{array}{r} 7 \\ -\ 0 \\ \hline 7 \end{array} \quad \begin{array}{r} 4 \\ -\ 2 \\ \hline 2 \end{array} \quad \begin{array}{r} 9 \\ -\ 0 \\ \hline 9 \end{array} \quad \begin{array}{r} 8 \\ -\ 7 \\ \hline 1 \end{array} \quad \begin{array}{r} 3 \\ -\ 2 \\ \hline 1 \end{array} \quad \begin{array}{r} 1 \\ -\ 1 \\ \hline 0 \end{array} \quad \begin{array}{r} 8 \\ -\ 5 \\ \hline 3 \end{array} \quad \begin{array}{r} 5 \\ -\ 2 \\ \hline 3 \end{array} \quad \begin{array}{r} 6 \\ -\ 6 \\ \hline 0 \end{array}$$

2.

$$\begin{array}{r} 6 \\ -\ 3 \\ \hline 3 \end{array} \quad \begin{array}{r} 5 \\ -\ 4 \\ \hline 1 \end{array} \quad \begin{array}{r} 7 \\ -\ 7 \\ \hline 0 \end{array} \quad \begin{array}{r} 4 \\ -\ 3 \\ \hline 1 \end{array} \quad \begin{array}{r} 9 \\ -\ 2 \\ \hline 7 \end{array} \quad \begin{array}{r} 8 \\ -\ 5 \\ \hline 3 \end{array} \quad \begin{array}{r} 2 \\ -\ 0 \\ \hline 2 \end{array} \quad \begin{array}{r} 6 \\ -\ 2 \\ \hline 4 \end{array} \quad \begin{array}{r} 7 \\ -\ 6 \\ \hline 1 \end{array} \quad \begin{array}{r} 9 \\ -\ 6 \\ \hline 3 \end{array}$$

3.

$$\begin{array}{r} 4 \\ -\ 0 \\ \hline 4 \end{array} \quad \begin{array}{r} 8 \\ -\ 2 \\ \hline 6 \end{array} \quad \begin{array}{r} 13 \\ -\ 8 \\ \hline 5 \end{array} \quad \begin{array}{r} 9 \\ -\ 1 \\ \hline 8 \end{array} \quad \begin{array}{r} 6 \\ -\ 6 \\ \hline 0 \end{array} \quad \begin{array}{r} 12 \\ -\ 3 \\ \hline 9 \end{array} \quad \begin{array}{r} 3 \\ -\ 1 \\ \hline 2 \end{array} \quad \begin{array}{r} 15 \\ -\ 7 \\ \hline 8 \end{array} \quad \begin{array}{r} 11 \\ -\ 5 \\ \hline 6 \end{array} \quad \begin{array}{r} 4 \\ -\ 1 \\ \hline 3 \end{array}$$

If you have less than 24 correct, see your instructor for additional help.

Activity 6 - Subtracting Whole Numbers

(2) Directions: Subtract.

1\.

$$\begin{array}{r}10\\-\ 5\\\hline 5\end{array}\quad\begin{array}{r}5\\-\ 1\\\hline 4\end{array}\quad\begin{array}{r}18\\-\ 9\\\hline 9\end{array}\quad\begin{array}{r}8\\-\ 2\\\hline 6\end{array}\quad\begin{array}{r}6\\-\ 6\\\hline 0\end{array}\quad\begin{array}{r}15\\-\ 7\\\hline 8\end{array}\quad\begin{array}{r}9\\-\ 7\\\hline 2\end{array}\quad\begin{array}{r}16\\-\ 9\\\hline 7\end{array}\quad\begin{array}{r}5\\-\ 5\\\hline 0\end{array}\quad\begin{array}{r}12\\-\ 4\\\hline 8\end{array}$$

2\.

$$\begin{array}{r}5\\-\ 3\\\hline 2\end{array}\quad\begin{array}{r}7\\-\ 6\\\hline 1\end{array}\quad\begin{array}{r}8\\-\ 3\\\hline 5\end{array}\quad\begin{array}{r}13\\-\ 5\\\hline 8\end{array}\quad\begin{array}{r}11\\-\ 3\\\hline 8\end{array}\quad\begin{array}{r}7\\-\ 2\\\hline 5\end{array}\quad\begin{array}{r}8\\-\ 0\\\hline 8\end{array}\quad\begin{array}{r}11\\-\ 9\\\hline 2\end{array}\quad\begin{array}{r}10\\-\ 7\\\hline 3\end{array}\quad\begin{array}{r}9\\-\ 9\\\hline 0\end{array}$$

3\.

$$\begin{array}{r}13\\-\ 8\\\hline 5\end{array}\quad\begin{array}{r}12\\-\ 3\\\hline 9\end{array}\quad\begin{array}{r}11\\-\ 5\\\hline 6\end{array}\quad\begin{array}{r}2\\-\ 2\\\hline 0\end{array}\quad\begin{array}{r}7\\-\ 0\\\hline 7\end{array}\quad\begin{array}{r}13\\-\ 9\\\hline 4\end{array}\quad\begin{array}{r}6\\-\ 5\\\hline 1\end{array}\quad\begin{array}{r}6\\-\ 1\\\hline 5\end{array}\quad\begin{array}{r}9\\-\ 0\\\hline 9\end{array}\quad\begin{array}{r}13\\-\ 6\\\hline 7\end{array}$$

If you have less than 24 correct, see your instructor for additional help.

Activity 6 - Subtracting Whole Numbers

(3) Directions: Subtract.

1.	16	8	10	5	6	5	7	14	18	11
	- 7	- 6	- 5	- 4	- 2	- 1	- 3	- 8	- 9	- 4
	9	2	5	1	4	4	4	6	9	7

2.	12	10	12	14	7	10	16	5	7	11
	- 5	- 3	- 8	- 9	- 5	- 4	- 7	- 4	- 3	- 4
	7	7	4	5	2	6	9	1	4	7

3.	7	5	13	14	3	4	15	10	9	2
	- 1	- 2	- 7	- 6	- 2	- 3	- 6	- 9	- 3	- 1
	6	3	6	8	1	1	9	1	6	1

If you have less than 24 correct, see your instructor for additional help.

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Applied Math

Activity 6 - Subtracting Whole Numbers

(4) Directions: Subtract.

1.	13	4	9	5	8	3	1	8	11	12
	- 7	- 3	- 3	- 0	- 5	- 3	- 1	- 7	- 6	- 7
	6	1	6	5	3	0	0	1	5	5

2.	9	12	10	7	11	11	7	14	15	2
	- 8	- 9	- 8	- 6	- 3	- 9	- 1	- 6	- 6	- 1
	1	3	2	1	8	2	6	8	9	1

3.	10	14	12	6	7	11	9	10	1	8
	- 1	- 9	- 6	- 0	- 5	- 7	- 5	- 4	- 0	- 1
	9	5	6	6	2	4	4	6	1	7

If you have less than 24 correct, see your instructor for additional help.

Activity 6 - Subtracting Whole Numbers

(5) Directions: Subtract.

1.

14	11	2	17	16	4	5	13	8	9
- 7	- 2	- 0	- 9	- 8	- 2	- 3	- 5	- 0	- 9
7	9	2	8	8	2	2	8	8	0

2.

6	5	10	13	8	17	7	3	15	11
- 4	- 0	- 2	- 4	- 5	- 8	- 4	- 3	- 9	- 8
2	5	8	9	3	9	3	0	6	3

3.

6	15	4	3	9	7	10	6	9	8
- 3	- 8	- 4	- 0	- 4	- 7	- 1	- 0	- 5	- 1
3	7	0	3	5	0	9	6	4	7

If you have less than 24 correct, see your instructor for additional help.

Activity 6 - Subtracting Whole Numbers

(6) Directions: Subtract.

1.

$$\begin{array}{r} 1 \\ -\ 1 \\ \hline 0 \end{array} \quad \begin{array}{r} 14 \\ -\ 5 \\ \hline 9 \end{array} \quad \begin{array}{r} 6 \\ -\ 3 \\ \hline 3 \end{array} \quad \begin{array}{r} 8 \\ -\ 7 \\ \hline 1 \end{array} \quad \begin{array}{r} 9 \\ -\ 6 \\ \hline 3 \end{array} \quad \begin{array}{r} 15 \\ -\ 8 \\ \hline 7 \end{array} \quad \begin{array}{r} 11 \\ -\ 6 \\ \hline 5 \end{array} \quad \begin{array}{r} 10 \\ -\ 6 \\ \hline 4 \end{array} \quad \begin{array}{r} 4 \\ -\ 4 \\ \hline 0 \end{array} \quad \begin{array}{r} 12 \\ -\ 7 \\ \hline 5 \end{array}$$

2.

$$\begin{array}{r} 12 \\ -\ 6 \\ \hline 6 \end{array} \quad \begin{array}{r} 11 \\ -\ 7 \\ \hline 4 \end{array} \quad \begin{array}{r} 1 \\ -\ 0 \\ \hline 1 \end{array} \quad \begin{array}{r} 8 \\ -\ 6 \\ \hline 2 \end{array} \quad \begin{array}{r} 6 \\ -\ 2 \\ \hline 4 \end{array} \quad \begin{array}{r} 14 \\ -\ 8 \\ \hline 6 \end{array} \quad \begin{array}{r} 4 \\ -\ 0 \\ \hline 4 \end{array} \quad \begin{array}{r} 9 \\ -\ 1 \\ \hline 8 \end{array} \quad \begin{array}{r} 3 \\ -\ 1 \\ \hline 2 \end{array} \quad \begin{array}{r} 4 \\ -\ 1 \\ \hline 3 \end{array}$$

3.

$$\begin{array}{r} 8 \\ -\ 3 \\ \hline 5 \end{array} \quad \begin{array}{r} 7 \\ -\ 2 \\ \hline 5 \end{array} \quad \begin{array}{r} 10 \\ -\ 7 \\ \hline 3 \end{array} \quad \begin{array}{r} 5 \\ -\ 2 \\ \hline 3 \end{array} \quad \begin{array}{r} 3 \\ -\ 2 \\ \hline 1 \end{array} \quad \begin{array}{r} 10 \\ -\ 9 \\ \hline 1 \end{array} \quad \begin{array}{r} 6 \\ -\ 4 \\ \hline 2 \end{array} \quad \begin{array}{r} 13 \\ -\ 4 \\ \hline 9 \end{array} \quad \begin{array}{r} 7 \\ -\ 4 \\ \hline 3 \end{array} \quad \begin{array}{r} 11 \\ -\ 8 \\ \hline 3 \end{array}$$

If you have less than 24 correct, see your instructor for additional help.

Activity 6 - Subtracting Whole Numbers

(7) Directions: Subtract.

1.	6	17	9	6	16	12	9	4	10	13
	- 5	- 9	- 8	- 1	- 8	- 9	- 0	- 2	- 8	- 6
	1	8	1	5	8	3	9	2	2	7

2.	10	17	15	14	9	10	9	8	13	8
	- 2	- 8	- 9	- 5	- 6	- 6	- 2	- 8	- 6	- 4
	8	9	6	9	3	4	7	0	7	4

3.	9	2	14	16	7	11	5	13	2	12
	- 7	- 2	- 7	- 9	- 0	- 2	- 5	- 9	- 0	- 4
	2	0	7	7	7	9	0	4	2	8

If you have less than 24 correct, see your instructor for additional help.

Activity 6 - Subtracting Whole Numbers

(8) Directions: Subtract and check.

1.

$$\begin{array}{r} 60 \\ -\ 40 \\ \hline 20 \end{array} \qquad \begin{array}{r} 35 \\ -\ 21 \\ \hline 14 \end{array} \qquad \begin{array}{r} 77 \\ -\ 73 \\ \hline 4 \end{array} \qquad \begin{array}{r} 74 \\ -\ 40 \\ \hline 34 \end{array} \qquad \begin{array}{r} 58 \\ -\ 32 \\ \hline 26 \end{array}$$

2.

$$\begin{array}{r} 63 \\ -\ 22 \\ \hline 41 \end{array} \qquad \begin{array}{r} 72 \\ -\ 70 \\ \hline 2 \end{array} \qquad \begin{array}{r} 85 \\ -\ 34 \\ \hline 51 \end{array} \qquad \begin{array}{r} 96 \\ -\ 62 \\ \hline 34 \end{array} \qquad \begin{array}{r} 43 \\ -\ 43 \\ \hline 0 \end{array}$$

3.

$$\begin{array}{r} 91 \\ -\ 6 \\ \hline 85 \end{array} \qquad \begin{array}{r} 62 \\ -\ 9 \\ \hline 53 \end{array} \qquad \begin{array}{r} 33 \\ -\ 4 \\ \hline 29 \end{array} \qquad \begin{array}{r} 52 \\ -\ 27 \\ \hline 25 \end{array} \qquad \begin{array}{r} 45 \\ -\ 16 \\ \hline 29 \end{array}$$

If you have less than 12 correct, see your instructor for additional help.

Activity 6 - Subtracting Whole Numbers

(9) Directions: Subtract and check.

1.	57	43	65	82	60
	- 18	- 25	- 8	- 75	- 42
	39	18	57	7	18
2.	36	48	51	25	74
	- 18	- 29	- 36	- 18	- 27
	18	19	15	7	47
3.	34	69	38	52	75
	- 22	- 35	- 31	- 32	- 51
	12	34	7	20	24

If you have less than 12 correct, see your instructor for additional help.

Activity 6 - Subtracting Whole Numbers

(10) Directions: Subtract and check.

1.	82	27	21	95	63
	- 9	- 8	- 7	- 8	- 5
	73	19	14	87	58
2.	54	28	94	77	58
	- 33	- 14	- 51	- 36	- 48
	21	14	43	41	10
3.	83	95	50	68	97
	- 25	- 39	- 28	- 49	- 58
	58	56	22	19	39

If you have less than 12 correct, see your instructor for additional help.

Activity 6 - Subtracting Whole Numbers

(11) Directions: Subtract and check.

1.
$$\begin{array}{r} 78 \\ -\ 15 \\ \hline 63 \end{array} \qquad \begin{array}{r} 28 \\ -\ 10 \\ \hline 18 \end{array} \qquad \begin{array}{r} 56 \\ -\ 12 \\ \hline 44 \end{array} \qquad \begin{array}{r} 67 \\ -\ 25 \\ \hline 42 \end{array} \qquad \begin{array}{r} 79 \\ -\ 54 \\ \hline 25 \end{array}$$

2.
$$\begin{array}{r} 67 \\ -\ 8 \\ \hline 59 \end{array} \qquad \begin{array}{r} 95 \\ -\ 9 \\ \hline 86 \end{array} \qquad \begin{array}{r} 48 \\ -\ 9 \\ \hline 39 \end{array} \qquad \begin{array}{r} 68 \\ -\ 9 \\ \hline 59 \end{array} \qquad \begin{array}{r} 84 \\ -\ 7 \\ \hline 77 \end{array}$$

3.
$$\begin{array}{r} 76 \\ -\ 7 \\ \hline 69 \end{array} \qquad \begin{array}{r} 47 \\ -\ 8 \\ \hline 39 \end{array} \qquad \begin{array}{r} 94 \\ -\ 8 \\ \hline 86 \end{array} \qquad \begin{array}{r} 81 \\ -\ 40 \\ \hline 41 \end{array} \qquad \begin{array}{r} 62 \\ -\ 11 \\ \hline 51 \end{array}$$

If you have less than 12 correct, see your instructor for additional help.

Activity 6 - Subtracting Whole Numbers

(12) Directions: Subtract and check.

1.	85	44	68	70	42
	- 16	- 27	- 59	- 32	- 18
	69	17	9	38	24

2.	76	21	65	87	48
	- 71	- 11	- 53	- 62	- 17
	5	10	12	25	31

3.	53	28	97	79	64
	- 36	- 19	- 28	- 58	- 26
	17	9	69	21	38

If you have less than 12 correct, see your instructor for additional help.

Activity 6 - Subtracting Whole Numbers

(13) Directions: Subtract and check.

1.
$$\begin{array}{r} 75 \\ -\ 17 \\ \hline 58 \end{array} \qquad \begin{array}{r} 71 \\ -\ 26 \\ \hline 45 \end{array} \qquad \begin{array}{r} 38 \\ -\ 19 \\ \hline 19 \end{array} \qquad \begin{array}{r} 24 \\ -\ 11 \\ \hline 13 \end{array} \qquad \begin{array}{r} 92 \\ -\ 39 \\ \hline 53 \end{array}$$

2.
$$\begin{array}{r} 57 \\ -\ 29 \\ \hline 28 \end{array} \qquad \begin{array}{r} 61 \\ -\ 34 \\ \hline 27 \end{array} \qquad \begin{array}{r} 92 \\ -\ 83 \\ \hline 9 \end{array} \qquad \begin{array}{r} 41 \\ -\ 21 \\ \hline 20 \end{array} \qquad \begin{array}{r} 37 \\ -\ 15 \\ \hline 22 \end{array}$$

3.
$$\begin{array}{r} 62 \\ -\ 21 \\ \hline 41 \end{array} \qquad \begin{array}{r} 46 \\ -\ 25 \\ \hline 21 \end{array} \qquad \begin{array}{r} 58 \\ -\ 26 \\ \hline 32 \end{array} \qquad \begin{array}{r} 61 \\ -\ 47 \\ \hline 14 \end{array} \qquad \begin{array}{r} 92 \\ -\ 29 \\ \hline 63 \end{array}$$

If you have less than 12 correct, see your instructor for additional help.

Activity 6 - Subtracting Whole Numbers

(14) Directions: Subtract and check.

1. $\begin{array}{r} 300 \\ -\ 37 \\ \hline 263 \end{array}$ $\quad \begin{array}{r} 400 \\ -\ 45 \\ \hline 355 \end{array}$ $\quad \begin{array}{r} 600 \\ -\ 63 \\ \hline 537 \end{array}$ $\quad \begin{array}{r} 200 \\ -\ 34 \\ \hline 166 \end{array}$ $\quad \begin{array}{r} 900 \\ -\ 51 \\ \hline 849 \end{array}$

2. $\begin{array}{r} 553 \\ -\ 69 \\ \hline 484 \end{array}$ $\quad \begin{array}{r} 417 \\ -\ 58 \\ \hline 359 \end{array}$ $\quad \begin{array}{r} 864 \\ -\ 87 \\ \hline 777 \end{array}$ $\quad \begin{array}{r} 241 \\ -\ 48 \\ \hline 193 \end{array}$ $\quad \begin{array}{r} 752 \\ -\ 57 \\ \hline 695 \end{array}$

3. $\begin{array}{r} 251 \\ -\ 38 \\ \hline 213 \end{array}$ $\quad \begin{array}{r} 742 \\ -\ 27 \\ \hline 715 \end{array}$ $\quad \begin{array}{r} 927 \\ -\ 18 \\ \hline 909 \end{array}$ $\quad \begin{array}{r} 381 \\ -\ 53 \\ \hline 328 \end{array}$ $\quad \begin{array}{r} 793 \\ -\ 86 \\ \hline 707 \end{array}$

If you have less than 12 correct, see your instructor for additional help.

Activity 6 - Subtracting Whole Numbers

(15) Directions: Subtract and check.

1.	896	692	546	695	588
	- 88	- 85	- 37	- 88	- 79
	808	607	509	607	509

2.	205	306	402	508	206
	- 86	- 38	- 46	- 59	- 49
	119	268	356	449	157

3.	795	932	866	357	614
	- 29	- 38	- 47	- 28	- 17
	766	894	819	329	597

If you have less than 12 correct, see your instructor for additional help.

Cluster
Applied Math

Activity 6 - Subtracting Whole Numbers

(16) Directions: Subtract and check.

1. $$\begin{array}{r} 602 \\ -\ 58 \\ \hline 544 \end{array} \qquad \begin{array}{r} 501 \\ -\ 29 \\ \hline 472 \end{array} \qquad \begin{array}{r} 803 \\ -\ 37 \\ \hline 766 \end{array} \qquad \begin{array}{r} 902 \\ -\ 44 \\ \hline 858 \end{array} \qquad \begin{array}{r} 401 \\ -\ 53 \\ \hline 348 \end{array}$$

2. $$\begin{array}{r} 968 \\ -\ 74 \\ \hline 894 \end{array} \qquad \begin{array}{r} 141 \\ -\ 80 \\ \hline 61 \end{array} \qquad \begin{array}{r} 572 \\ -\ 91 \\ \hline 481 \end{array} \qquad \begin{array}{r} 543 \\ -\ 62 \\ \hline 481 \end{array} \qquad \begin{array}{r} 519 \\ -\ 53 \\ \hline 466 \end{array}$$

3. $$\begin{array}{r} 640 \\ -\ 27 \\ \hline 613 \end{array} \qquad \begin{array}{r} 365 \\ -\ 48 \\ \hline 317 \end{array} \qquad \begin{array}{r} 482 \\ -\ 75 \\ \hline 407 \end{array} \qquad \begin{array}{r} 981 \\ -\ 63 \\ \hline 918 \end{array} \qquad \begin{array}{r} 288 \\ -\ 59 \\ \hline 229 \end{array}$$

If you have less than 12 correct, see your instructor for additional help.

Activity 6 - Subtracting Whole Numbers

(17) Directions: Subtract and check.

1.

$$\begin{array}{r} 334 \\ -\ 299 \\ \hline 35 \end{array} \qquad \begin{array}{r} 634 \\ -\ 467 \\ \hline 167 \end{array} \qquad \begin{array}{r} 310 \\ -\ 123 \\ \hline 187 \end{array}$$

2.

$$\begin{array}{r} 246 \\ -\ 134 \\ \hline 112 \end{array} \qquad \begin{array}{r} 983 \\ -\ 672 \\ \hline 311 \end{array} \qquad \begin{array}{r} 643 \\ -\ 482 \\ \hline 161 \end{array}$$

3.

$$\begin{array}{r} 401 \\ -\ 389 \\ \hline 12 \end{array} \qquad \begin{array}{r} 893 \\ -\ 748 \\ \hline 145 \end{array} \qquad \begin{array}{r} 472 \\ -\ 472 \\ \hline 0 \end{array}$$

If you have less than 7 correct, see your instructor for additional help.

Activity 6 - Subtracting Whole Numbers

(18) Directions: Subtract and check.

1.

$$\begin{array}{r} 641 \\ -\ \underline{500} \\ 141 \end{array} \qquad \begin{array}{r} 812 \\ -\ \underline{602} \\ 210 \end{array} \qquad \begin{array}{r} 559 \\ -\ \underline{247} \\ 312 \end{array}$$

2.

$$\begin{array}{r} 885 \\ -\ \underline{452} \\ 433 \end{array} \qquad \begin{array}{r} 740 \\ -\ \underline{520} \\ 220 \end{array} \qquad \begin{array}{r} 482 \\ -\ \underline{331} \\ 151 \end{array}$$

3.

$$\begin{array}{r} 562 \\ -\ \underline{491} \\ 71 \end{array} \qquad \begin{array}{r} 496 \\ -\ \underline{263} \\ 233 \end{array} \qquad \begin{array}{r} 842 \\ -\ \underline{761} \\ 81 \end{array}$$

If you have less than 7 correct, see your instructor for additional help.

Activity 6 - Subtracting Whole Numbers

(19) Directions: Subtract and check.

1. $$\begin{array}{r} 525 \\ -\ 247 \\ \hline 278 \end{array} \qquad \begin{array}{r} 287 \\ -\ 198 \\ \hline 89 \end{array} \qquad \begin{array}{r} 216 \\ -\ 158 \\ \hline 58 \end{array}$$

2. $$\begin{array}{r} 305 \\ -\ 278 \\ \hline 27 \end{array} \qquad \begin{array}{r} 207 \\ -\ 199 \\ \hline 8 \end{array} \qquad \begin{array}{r} 401 \\ -\ 285 \\ \hline 116 \end{array}$$

3. $$\begin{array}{r} 466 \\ -\ 388 \\ \hline 78 \end{array} \qquad \begin{array}{r} 373 \\ -\ 199 \\ \hline 174 \end{array} \qquad \begin{array}{r} 983 \\ -\ 585 \\ \hline 398 \end{array}$$

If you have less than 7 correct, see your instructor for additional help.

Activity 6 - Subtracting Whole Numbers

(20) Directions: Subtract and check.

1.

$$\begin{array}{r} 502 \\ -\ 263 \\ \hline 239 \end{array} \qquad \begin{array}{r} 308 \\ -\ 149 \\ \hline 159 \end{array} \qquad \begin{array}{r} 604 \\ -\ 326 \\ \hline 278 \end{array}$$

2.

$$\begin{array}{r} 418 \\ -\ 279 \\ \hline 139 \end{array} \qquad \begin{array}{r} 957 \\ -\ 821 \\ \hline 136 \end{array} \qquad \begin{array}{r} 627 \\ -\ 468 \\ \hline 159 \end{array}$$

3.

$$\begin{array}{r} 650 \\ -\ 440 \\ \hline 210 \end{array} \qquad \begin{array}{r} 848 \\ -\ 232 \\ \hline 616 \end{array} \qquad \begin{array}{r} 567 \\ -\ 356 \\ \hline 211 \end{array}$$

If you have less than 7 correct, see your instructor for additional help.

Activity 6 - Subtracting Whole Numbers

(21) Directions: Subtract and check.

1.	$\begin{array}{r} 467 \\ -\ 349 \\ \hline 118 \end{array}$	$\begin{array}{r} 355 \\ -\ 237 \\ \hline 118 \end{array}$	$\begin{array}{r} 653 \\ -\ 409 \\ \hline 244 \end{array}$
2.	$\begin{array}{r} 983 \\ -\ 147 \\ \hline 836 \end{array}$	$\begin{array}{r} 578 \\ -\ 429 \\ \hline 149 \end{array}$	$\begin{array}{r} 356 \\ -\ 180 \\ \hline 176 \end{array}$
3.	$\begin{array}{r} 942 \\ -\ 611 \\ \hline 331 \end{array}$	$\begin{array}{r} 889 \\ -\ 278 \\ \hline 611 \end{array}$	$\begin{array}{r} 468 \\ -\ 432 \\ \hline 36 \end{array}$

If you have less than 7 correct, see your instructor for additional help.

Activity 6 - Subtracting Whole Numbers

(22) Directions: Subtract and check.

1.

$$\begin{array}{r} 893 \\ -\ 655 \\ \hline 238 \end{array} \qquad \begin{array}{r} 972 \\ -\ 408 \\ \hline 564 \end{array} \qquad \begin{array}{r} 331 \\ -\ 125 \\ \hline 206 \end{array}$$

2.

$$\begin{array}{r} 362 \\ -\ 188 \\ \hline 174 \end{array} \qquad \begin{array}{r} 721 \\ -\ 356 \\ \hline 365 \end{array} \qquad \begin{array}{r} 982 \\ -\ 581 \\ \hline 401 \end{array}$$

3.

$$\begin{array}{r} 371 \\ -\ 269 \\ \hline 102 \end{array} \qquad \begin{array}{r} 684 \\ -\ 547 \\ \hline 137 \end{array} \qquad \begin{array}{r} 143 \\ -\ 128 \\ \hline 15 \end{array}$$

If you have less than 7 correct, see your instructor for additional help.

Activity 6 - Subtracting Whole Numbers

(23) Directions: Subtract and check.

1.
$$\begin{array}{r} 974 \\ -\ 923 \\ \hline 51 \end{array} \qquad \begin{array}{r} 567 \\ -\ 524 \\ \hline 43 \end{array} \qquad \begin{array}{r} 534 \\ -\ 311 \\ \hline 223 \end{array}$$

2.
$$\begin{array}{r} 337 \\ -\ 155 \\ \hline 182 \end{array} \qquad \begin{array}{r} 812 \\ -\ 90 \\ \hline 722 \end{array} \qquad \begin{array}{r} 764 \\ -\ 581 \\ \hline 183 \end{array}$$

3.
$$\begin{array}{r} 952 \\ -\ 940 \\ \hline 12 \end{array} \qquad \begin{array}{r} 540 \\ -\ 230 \\ \hline 310 \end{array} \qquad \begin{array}{r} 686 \\ -\ 251 \\ \hline 435 \end{array}$$

If you have less than 7 correct, see your instructor for additional help.

Activity 6 - Subtracting Whole Numbers

(24) Directions: Subtract and check.

1.

$$\begin{array}{r} 794 \\ -\ 478 \\ \hline 316 \end{array} \qquad \begin{array}{r} 652 \\ -\ 239 \\ \hline 413 \end{array} \qquad \begin{array}{r} 498 \\ -\ 379 \\ \hline 119 \end{array}$$

2.

$$\begin{array}{r} 563 \\ -\ 185 \\ \hline 378 \end{array} \qquad \begin{array}{r} 777 \\ -\ 298 \\ \hline 479 \end{array} \qquad \begin{array}{r} 835 \\ -\ 348 \\ \hline 487 \end{array}$$

3.

$$\begin{array}{r} 364 \\ -\ 263 \\ \hline 101 \end{array} \qquad \begin{array}{r} 751 \\ -\ 401 \\ \hline 350 \end{array} \qquad \begin{array}{r} 523 \\ -\ 321 \\ \hline 202 \end{array}$$

If you have less than 7 correct, see your instructor for additional help.

Activity 6 - Subtracting Whole Numbers

(25) Directions: Subtract and check.

1.

$$\begin{array}{r} 458 \\ -\ 349 \\ \hline 109 \end{array} \qquad \begin{array}{r} 691 \\ -\ 227 \\ \hline 464 \end{array} \qquad \begin{array}{r} 854 \\ -\ 536 \\ \hline 318 \end{array}$$

2.

$$\begin{array}{r} 278 \\ -\ 119 \\ \hline 159 \end{array} \qquad \begin{array}{r} 445 \\ -\ 108 \\ \hline 337 \end{array} \qquad \begin{array}{r} 764 \\ -\ 545 \\ \hline 219 \end{array}$$

3.

$$\begin{array}{r} 249 \\ -\ 134 \\ \hline 115 \end{array} \qquad \begin{array}{r} 553 \\ -\ 243 \\ \hline 310 \end{array} \qquad \begin{array}{r} 916 \\ -\ 503 \\ \hline 413 \end{array}$$

If you have less than 7 correct, see your instructor for additional help.

Activity 6 - Subtracting Whole Numbers

(26) Directions: Subtract and check.

1.
$$\begin{array}{r} 683 \\ -\ 421 \\ \hline 262 \end{array} \qquad \begin{array}{r} 944 \\ -\ 703 \\ \hline 241 \end{array} \qquad \begin{array}{r} 871 \\ -\ 260 \\ \hline 611 \end{array}$$

2.
$$\begin{array}{r} 772 \\ -\ 341 \\ \hline 431 \end{array} \qquad \begin{array}{r} 908 \\ -\ 305 \\ \hline 603 \end{array} \qquad \begin{array}{r} 197 \\ -\ 122 \\ \hline 75 \end{array}$$

3.
$$\begin{array}{r} 887 \\ -\ 352 \\ \hline 535 \end{array} \qquad \begin{array}{r} 543 \\ -\ 243 \\ \hline 300 \end{array} \qquad \begin{array}{r} 781 \\ -\ 300 \\ \hline 481 \end{array}$$

If you have less than 7 correct, see your instructor for additional help.

Activity 6 - Subtracting Whole Numbers

(27) Directions: Subtract and check.

1.

$$\begin{array}{r} 692 \\ -\ 491 \\ \hline 201 \end{array} \qquad \begin{array}{r} 485 \\ -\ 324 \\ \hline 161 \end{array} \qquad \begin{array}{r} 727 \\ -\ 512 \\ \hline 215 \end{array}$$

2.

$$\begin{array}{r} 739 \\ -\ 628 \\ \hline 111 \end{array} \qquad \begin{array}{r} 609 \\ -\ 203 \\ \hline 406 \end{array} \qquad \begin{array}{r} 957 \\ -\ 342 \\ \hline 615 \end{array}$$

3.

$$\begin{array}{r} 266 \\ -\ 118 \\ \hline 148 \end{array} \qquad \begin{array}{r} 385 \\ -\ 166 \\ \hline 219 \end{array} \qquad \begin{array}{r} 597 \\ -\ 408 \\ \hline 189 \end{array}$$

If you have less than 7 correct, see your instructor for additional help.

Activity 6 - Subtracting Whole Numbers

(28) Directions: Subtract and check.

1.
$$\begin{array}{r} 800 \\ -\ \underline{263} \\ 537 \end{array} \qquad \begin{array}{r} 300 \\ -\ \underline{127} \\ 173 \end{array} \qquad \begin{array}{r} 500 \\ -\ \underline{233} \\ 267 \end{array}$$

2.
$$\begin{array}{r} 400 \\ -\ \underline{291} \\ 109 \end{array} \qquad \begin{array}{r} 600 \\ -\ \underline{382} \\ 218 \end{array} \qquad \begin{array}{r} 200 \\ -\ \underline{194} \\ 6 \end{array}$$

3.
$$\begin{array}{r} 700 \\ -\ \underline{266} \\ 434 \end{array} \qquad \begin{array}{r} 900 \\ -\ \underline{724} \\ 176 \end{array} \qquad \begin{array}{r} 300 \\ -\ \underline{123} \\ 177 \end{array}$$

If you have less than 7 correct, see your instructor for additional help.

Activity 6 - Subtracting Whole Numbers

(29) Directions: Subtract and check.

1.
$$\begin{array}{r} 5,037 \\ -\ 329 \\ \hline 4,708 \end{array} \qquad \begin{array}{r} 1,201 \\ -\ 642 \\ \hline 559 \end{array} \qquad \begin{array}{r} 5,834 \\ -\ 855 \\ \hline 4,979 \end{array}$$

2.
$$\begin{array}{r} 3,633 \\ -\ 794 \\ \hline 2,839 \end{array} \qquad \begin{array}{r} 4,125 \\ -\ 636 \\ \hline 3,489 \end{array} \qquad \begin{array}{r} 2,961 \\ -\ 972 \\ \hline 1,989 \end{array}$$

3.
$$\begin{array}{r} 1,896 \\ -\ 484 \\ \hline 1,412 \end{array} \qquad \begin{array}{r} 1,896 \\ -\ 494 \\ \hline 1,402 \end{array} \qquad \begin{array}{r} 1,896 \\ -\ 498 \\ \hline 1,398 \end{array}$$

If you have less than 7 correct, see your instructor for additional help.

Activity 6 - Subtracting Whole Numbers

(30) Directions: Subtract and check.

1.	1,876 - 689 1,187	3,243 - 892 2,351	3,243 - 856 2,387
2.	5,648 - 649 4,999	6,345 - 258 6,087	1,827 - 918 909
3.	8,002 - 628 7,374	9,003 - 324 8,679	4,005 - 556 3,449

If you have less than 7 correct, see your instructor for additional help.

Activity 6 - Subtracting Whole Numbers

(31) Directions: Subtract and check.

1.	4,080 - 387 3,693	3,070 - 991 2,079	5,020 - 438 4,582
2.	1,896 - 499 1,397	1,004 - 687 317	4,468 - 579 3,889
3.	3,006 - 439 2,567	8,007 - 299 7,708	1,006 - 307 699

If you have less than 7 correct, see your instructor for additional help.

Activity 6 - Subtracting Whole Numbers

(32) Directions: Subtract and check.

1.	2,040	3,060	1,050
	- 462	- 392	- 465
	1,578	2,668	585
2.	4,003	9,002	6,001
	- 621	- 972	- 430
	3,382	8,030	5,571
3.	7,263	4,775	5,176
	- 185	- 683	- 438
	7,078	4,092	4,738

If you have less than 7 correct, see your instructor for additional help.

Activity 6 - Subtracting Whole Numbers

(33) Directions: Subtract and check.

1.

$$\begin{array}{r} 8{,}240 \\ -\quad 327 \\ \hline 7{,}913 \end{array} \qquad\qquad \begin{array}{r} 2{,}334 \\ -\quad 516 \\ \hline 1{,}818 \end{array} \qquad\qquad \begin{array}{r} 1{,}615 \\ -\quad 807 \\ \hline 808 \end{array}$$

2.

$$\begin{array}{r} 3{,}004 \\ -\quad 973 \\ \hline 2{,}031 \end{array} \qquad\qquad \begin{array}{r} 5{,}006 \\ -\quad 425 \\ \hline 4{,}581 \end{array} \qquad\qquad \begin{array}{r} 2{,}007 \\ -\quad 347 \\ \hline 1{,}660 \end{array}$$

If you have less than 5 correct, see your instructor for additional help.

Activity 6 - Subtracting Whole Numbers

(34) Directions: Subtract and check.

1.	1,000	6,000	7,000
	- 533	- 407	- 316
	467	5,593	6,684

2.	5,000	4,000	8,000
	- 436	- 228	- 927
	4,564	3,772	7,073

If you have less than 5 correct, see your instructor for additional help.

Activity 6 - Subtracting Whole Numbers

(35) Directions: Subtract and check.

1. $\begin{array}{r} 3{,}675 \\ -\ 1{,}786 \\ \hline 1{,}889 \end{array}$ $\qquad$ $\begin{array}{r} 6{,}547 \\ -\ 3{,}849 \\ \hline 2{,}698 \end{array}$ $\qquad$ $\begin{array}{r} 5{,}000 \\ -\ 2{,}485 \\ \hline 2{,}515 \end{array}$

2. $\begin{array}{r} 5{,}010 \\ -\ 3{,}466 \\ \hline 1{,}544 \end{array}$ $\qquad$ $\begin{array}{r} 2{,}010 \\ -\ 1{,}277 \\ \hline 733 \end{array}$ $\qquad$ $\begin{array}{r} 8{,}010 \\ -\ 4{,}252 \\ \hline 3{,}758 \end{array}$

3. $\begin{array}{r} 5{,}789 \\ -\ 3{,}576 \\ \hline 2{,}213 \end{array}$ $\qquad$ $\begin{array}{r} 5{,}357 \\ -\ 3{,}152 \\ \hline 2{,}205 \end{array}$ $\qquad$ $\begin{array}{r} 4{,}001 \\ -\ 3{,}792 \\ \hline 209 \end{array}$

If you have less than 7 correct, see your instructor for additional help.

Activity 6 - Subtracting Whole Numbers

(36) Directions: Subtract and check.

1.

$$\begin{array}{r} 6{,}050 \\ -\ 2{,}367 \\ \hline 3{,}683 \end{array} \qquad \begin{array}{r} 2{,}040 \\ -\ 1{,}248 \\ \hline 792 \end{array} \qquad \begin{array}{r} 3{,}010 \\ -\ 2{,}563 \\ \hline 447 \end{array}$$

2.

$$\begin{array}{r} 4{,}556 \\ -\ 2{,}377 \\ \hline 2{,}179 \end{array} \qquad \begin{array}{r} 6{,}281 \\ -\ 4{,}182 \\ \hline 2{,}099 \end{array} \qquad \begin{array}{r} 7{,}635 \\ -\ 3{,}576 \\ \hline 4{,}059 \end{array}$$

3.

$$\begin{array}{r} 7{,}008 \\ -\ 4{,}106 \\ \hline 2{,}902 \end{array} \qquad \begin{array}{r} 6{,}180 \\ -\ 5{,}932 \\ \hline 248 \end{array} \qquad \begin{array}{r} 3{,}557 \\ -\ 1{,}648 \\ \hline 1{,}909 \end{array}$$

If you have less than 7 correct, see your instructor for additional help.

Activity 6 - Subtracting Whole Numbers

(37) Directions: Subtract and check.

1.

$$\begin{array}{r} 9{,}216 \\ -\ 8{,}136 \\ \hline 1{,}080 \end{array} \qquad \begin{array}{r} 4{,}063 \\ -\ 2{,}357 \\ \hline 1{,}706 \end{array} \qquad \begin{array}{r} 6{,}020 \\ -\ 4{,}273 \\ \hline 1{,}747 \end{array}$$

2.

$$\begin{array}{r} 2{,}111 \\ -\ 1{,}789 \\ \hline 322 \end{array} \qquad \begin{array}{r} 3{,}992 \\ -\ 2{,}009 \\ \hline 1{,}983 \end{array} \qquad \begin{array}{r} 2{,}612 \\ -\ 1{,}777 \\ \hline 835 \end{array}$$

3.

$$\begin{array}{r} 2{,}040 \\ -\ 1{,}537 \\ \hline 503 \end{array} \qquad \begin{array}{r} 3{,}004 \\ -\ 1{,}252 \\ \hline 1{,}752 \end{array} \qquad \begin{array}{r} 5{,}000 \\ -\ 2{,}430 \\ \hline 2{,}570 \end{array}$$

If you have less than 7 correct, see your instructor for additional help.

Activity 6 - Subtracting Whole Numbers

(38) Directions: Subtract and check.

1.

$$\begin{array}{r} 8{,}559 \\ -\ 4{,}208 \\ \hline 4{,}351 \end{array} \qquad \begin{array}{r} 7{,}388 \\ -\ 6{,}234 \\ \hline 1{,}154 \end{array} \qquad \begin{array}{r} 9{,}161 \\ -\ 5{,}031 \\ \hline 4{,}130 \end{array}$$

2.

$$\begin{array}{r} 7{,}200 \\ -\ 4{,}357 \\ \hline 2{,}843 \end{array} \qquad \begin{array}{r} 6{,}020 \\ -\ 5{,}919 \\ \hline 101 \end{array} \qquad \begin{array}{r} 8{,}004 \\ -\ 7{,}465 \\ \hline 539 \end{array}$$

3.

$$\begin{array}{r} 5{,}642 \\ -\ 5{,}459 \\ \hline 183 \end{array} \qquad \begin{array}{r} 7{,}873 \\ -\ 6{,}948 \\ \hline 925 \end{array} \qquad \begin{array}{r} 9{,}483 \\ -\ 2{,}624 \\ \hline 6{,}859 \end{array}$$

If you have less than 7 correct, see your instructor for additional help.

Activity 6 - Subtracting Whole Numbers

(39) Directions: Subtract and check.

1.
$$\begin{array}{rrr} 5{,}060 & \qquad 5{,}110 & \qquad 5{,}340 \\ -\ \underline{2{,}481} & \qquad -\ \underline{3{,}116} & \qquad -\ \underline{1{,}409} \\ 2{,}579 & \qquad 1{,}994 & \qquad 3{,}931 \end{array}$$

2.
$$\begin{array}{rrr} 6{,}200 & \qquad 3{,}060 & \qquad 4{,}002 \\ -\ \underline{2{,}576} & \qquad -\ \underline{1{,}485} & \qquad -\ \underline{3{,}268} \\ 3{,}624 & \qquad 1{,}575 & \qquad 734 \end{array}$$

3.
$$\begin{array}{rrr} 9{,}798 & \qquad 9{,}897 & \qquad 7{,}258 \\ -\ \underline{9{,}624} & \qquad -\ \underline{3{,}572} & \qquad -\ \underline{6{,}125} \\ 174 & \qquad 6{,}325 & \qquad 1{,}133 \end{array}$$

If you have less than 7 correct, see your instructor for additional help.

Activity 6 - Subtracting Whole Numbers

(40) Directions: Subtract and check.

1.

$$\begin{array}{r} 6,000 \\ -\ 2,999 \\ \hline 3,001 \end{array} \qquad \begin{array}{r} 3,050 \\ -\ 1,452 \\ \hline 1,598 \end{array} \qquad \begin{array}{r} 8,010 \\ -\ 2,669 \\ \hline 5,341 \end{array}$$

2.

$$\begin{array}{r} 6,867 \\ -\ 3,260 \\ \hline 3,607 \end{array} \qquad \begin{array}{r} 7,886 \\ -\ 4,253 \\ \hline 3,633 \end{array} \qquad \begin{array}{r} 7,980 \\ -\ 3,210 \\ \hline 4,770 \end{array}$$

3.

$$\begin{array}{r} 9,004 \\ -\ 2,916 \\ \hline 6,088 \end{array} \qquad \begin{array}{r} 5,005 \\ -\ 4,936 \\ \hline 69 \end{array} \qquad \begin{array}{r} 8,003 \\ -\ 1,227 \\ \hline 6,776 \end{array}$$

If you have less than 7 correct, see your instructor for additional help.

Activity 6 - Subtracting Whole Numbers

(41) Directions: Subtract and check.

1.
$$\begin{array}{r} 4{,}272 \\ -\;4{,}122 \\ \hline 150 \end{array} \qquad \begin{array}{r} 5{,}467 \\ -\;3{,}245 \\ \hline 2{,}222 \end{array} \qquad \begin{array}{r} 7{,}948 \\ -\;2{,}136 \\ \hline 5{,}812 \end{array}$$

2.
$$\begin{array}{r} 6{,}111 \\ -\;5{,}333 \\ \hline 778 \end{array} \qquad \begin{array}{r} 9{,}635 \\ -\;7{,}936 \\ \hline 1{,}699 \end{array} \qquad \begin{array}{r} 3{,}243 \\ -\;2{,}876 \\ \hline 367 \end{array}$$

3.
$$\begin{array}{r} 7{,}245 \\ -\;7{,}123 \\ \hline 122 \end{array} \qquad \begin{array}{r} 4{,}278 \\ -\;3{,}072 \\ \hline 1{,}206 \end{array} \qquad \begin{array}{r} 2{,}657 \\ -\;1{,}452 \\ \hline 1{,}205 \end{array}$$

If you have less than 7 correct, see your instructor for additional help.

Activity 6 - Subtracting Whole Numbers

(42) Directions: Subtract and check.

1. $$\begin{array}{r} 7{,}253 \\ -\ 2{,}879 \\ \hline 4{,}374 \end{array} \qquad \begin{array}{r} 5{,}280 \\ -\ 3{,}285 \\ \hline 1{,}995 \end{array} \qquad \begin{array}{r} 7{,}880 \\ -\ 6{,}881 \\ \hline 999 \end{array}$$

2. $$\begin{array}{r} 4{,}003 \\ -\ 2{,}564 \\ \hline 1{,}439 \end{array} \qquad \begin{array}{r} 6{,}002 \\ -\ 3{,}574 \\ \hline 2{,}428 \end{array} \qquad \begin{array}{r} 3{,}008 \\ -\ 2{,}569 \\ \hline 439 \end{array}$$

3. $$\begin{array}{r} 6{,}235 \\ -\ 5{,}221 \\ \hline 1{,}014 \end{array} \qquad \begin{array}{r} 7{,}819 \\ -\ 4{,}308 \\ \hline 3{,}511 \end{array} \qquad \begin{array}{r} 6{,}798 \\ -\ 6{,}217 \\ \hline 581 \end{array}$$

If you have less than 7 correct, see your instructor for additional help.

Activity 6 - Subtracting Whole Numbers

(43) Directions: Subtract and check.

1.

$$\begin{array}{r} 6{,}635 \\ -\ 4{,}278 \\ \hline 2{,}357 \end{array} \qquad \begin{array}{r} 5{,}138 \\ -\ 4{,}357 \\ \hline 781 \end{array} \qquad \begin{array}{r} 2{,}537 \\ -\ 1{,}682 \\ \hline 855 \end{array}$$

2.

$$\begin{array}{r} 9{,}000 \\ -\ 2{,}544 \\ \hline 6{,}456 \end{array} \qquad \begin{array}{r} 7{,}000 \\ -\ 1{,}633 \\ \hline 5{,}367 \end{array} \qquad \begin{array}{r} 2{,}000 \\ -\ 1{,}429 \\ \hline 571 \end{array}$$

3.

$$\begin{array}{r} 4{,}000 \\ -\ 2{,}338 \\ \hline 1{,}662 \end{array} \qquad \begin{array}{r} 3{,}000 \\ -\ 1{,}426 \\ \hline 1{,}574 \end{array} \qquad \begin{array}{r} 5{,}000 \\ -\ 3{,}258 \\ \hline 1{,}742 \end{array}$$

If you have less than 7 correct, see your instructor for additional help.

Activity 6 - Subtracting Whole Numbers

(44) Directions: Subtract and check.

1.

$$\begin{array}{r} 7{,}395 \\ -\ 2{,}498 \\ \hline 4{,}897 \end{array} \qquad \begin{array}{r} 7{,}227 \\ -\ 4{,}285 \\ \hline 2{,}942 \end{array} \qquad \begin{array}{r} 5{,}684 \\ -\ 2{,}993 \\ \hline 2{,}691 \end{array}$$

2.

$$\begin{array}{r} 1{,}875 \\ -\ 1{,}096 \\ \hline 779 \end{array} \qquad \begin{array}{r} 7{,}620 \\ -\ 4{,}586 \\ \hline 3{,}034 \end{array} \qquad \begin{array}{r} 4{,}144 \\ -\ 2{,}139 \\ \hline 2{,}005 \end{array}$$

3.

$$\begin{array}{r} 4{,}726 \\ -\ 3{,}946 \\ \hline 780 \end{array} \qquad \begin{array}{r} 8{,}673 \\ -\ 1{,}888 \\ \hline 6{,}785 \end{array} \qquad \begin{array}{r} 2{,}865 \\ -\ 1{,}977 \\ \hline 888 \end{array}$$

If you have less than 7 correct, see your instructor for additional help.

Activity 6 - Subtracting Whole Numbers

(45) Directions: Subtract and check.

1.

$$\begin{array}{r} 7,792 \\ -\ 4,829 \\ \hline 2,963 \end{array} \qquad \begin{array}{r} 8,235 \\ -\ 3,516 \\ \hline 4,719 \end{array} \qquad \begin{array}{r} 2,047 \\ -\ 1,839 \\ \hline 208 \end{array}$$

2.

$$\begin{array}{r} 9,113 \\ -\ 2,058 \\ \hline 7,055 \end{array} \qquad \begin{array}{r} 2,474 \\ -\ 1,185 \\ \hline 1,289 \end{array} \qquad \begin{array}{r} 3,323 \\ -\ 2,196 \\ \hline 1,127 \end{array}$$

3.

$$\begin{array}{r} 7,488 \\ -\ 2,499 \\ \hline 4,989 \end{array} \qquad \begin{array}{r} 6,337 \\ -\ 3,878 \\ \hline 2,459 \end{array} \qquad \begin{array}{r} 6,154 \\ -\ 2,165 \\ \hline 3,989 \end{array}$$

If you have less than 7 correct, see your instructor for additional help.

Activity 6 - Subtracting Whole Numbers

(46) Directions: Subtract and check.

1.

$$\begin{array}{r} 2{,}328 \\ -\ \ 1{,}489 \\ \hline 839 \end{array} \qquad \begin{array}{r} 5{,}181 \\ -\ \ 2{,}397 \\ \hline 2{,}784 \end{array} \qquad \begin{array}{r} 8{,}760 \\ -\ \ 5{,}764 \\ \hline 2{,}996 \end{array}$$

2.

$$\begin{array}{r} 8{,}233 \\ -\ \ 7{,}148 \\ \hline 1{,}085 \end{array} \qquad \begin{array}{r} 6{,}145 \\ -\ \ 4{,}139 \\ \hline 2{,}006 \end{array} \qquad \begin{array}{r} 5{,}608 \\ -\ \ 2{,}786 \\ \hline 2{,}822 \end{array}$$

3.

$$\begin{array}{r} 4{,}871 \\ -\ \ 2{,}984 \\ \hline 1{,}887 \end{array} \qquad \begin{array}{r} 6{,}524 \\ -\ \ 3{,}576 \\ \hline 2{,}948 \end{array} \qquad \begin{array}{r} 2{,}775 \\ -\ \ 1{,}799 \\ \hline 976 \end{array}$$

If you have less than 7 correct, see your instructor for additional help.

Activity 6 - Subtracting Whole Numbers

(47) Directions: Subtract and check.

1.	5,167 - 2,758 2,409	4,660 - 1,857 2,803	7,133 - 2,924 4,209
2.	9,457 - 3,379 6,078	4,375 - 2,088 2,287	5,126 - 3,048 2,078
3.	9,310 - 4,975 4,335	3,124 - 2,368 756	8,725 - 4,956 3,769

If you have less than 7 correct, see your instructor for additional help.

Activity 6 - Subtracting Whole Numbers

(48) Directions: Subtract and check.

1.

$$\begin{array}{r} 16{,}253 \\ -\ \ 7{,}468 \\ \hline 8{,}785 \end{array} \qquad \begin{array}{r} 96{,}973 \\ -\ \ 4{,}982 \\ \hline 91{,}991 \end{array} \qquad \begin{array}{r} 42{,}763 \\ -\ \ 5{,}589 \\ \hline 37{,}174 \end{array}$$

2.

$$\begin{array}{r} 32{,}617 \\ -\ \ 1{,}758 \\ \hline 30{,}859 \end{array} \qquad \begin{array}{r} 63{,}522 \\ -\ \ 7{,}740 \\ \hline 55{,}782 \end{array} \qquad \begin{array}{r} 46{,}233 \\ -\ \ 6{,}451 \\ \hline 39{,}782 \end{array}$$

3.

$$\begin{array}{r} 14{,}441 \\ -\ \ 1{,}664 \\ \hline 12{,}777 \end{array} \qquad \begin{array}{r} 47{,}757 \\ -\ \ 6{,}858 \\ \hline 40{,}899 \end{array} \qquad \begin{array}{r} 81{,}912 \\ -\ \ 1{,}943 \\ \hline 79{,}969 \end{array}$$

If you have less than 7 correct, see your instructor for additional help.

Activity 6 - Subtracting Whole Numbers

(49) Directions: Subtract and check.

1.	84,056	52,535	60,722
	- 2,081	- 8,218	- 5,401
	81,975	44,317	55,321
2.	75,823	87,214	59,656
	- 6,458	- 6,209	- 5,458
	69,365	81,005	54,198
3.	10,306	12,060	68,350
	- 9,378	- 3,061	- 4,060
	928	8,999	64,290

If you have less than 7 correct, see your instructor for additional help.

Activity 6 - Subtracting Whole Numbers

(50) Directions: Subtract and check.

1.

$$\begin{array}{r} 93{,}532 \\ -\ \ 9{,}544 \\ \hline 83{,}988 \end{array} \qquad \begin{array}{r} 83{,}124 \\ -\ \ 4{,}876 \\ \hline 78{,}248 \end{array}$$

2.

$$\begin{array}{r} 42{,}356 \\ -\ \ 9{,}485 \\ \hline 32{,}871 \end{array} \qquad \begin{array}{r} 38{,}182 \\ -\ \ 8{,}491 \\ \hline 29{,}691 \end{array}$$

3.

$$\begin{array}{r} 87{,}421 \\ -\ \ 9{,}530 \\ \hline 77{,}891 \end{array} \qquad \begin{array}{r} 41{,}591 \\ -\ \ 5{,}694 \\ \hline 35{,}897 \end{array}$$

If you have less than 5 correct, see your instructor for additional help.

Activity 6 - Subtracting Whole Numbers

(51) Directions: Subtract and check.

1.

$$\begin{array}{r} 35{,}876 \\ -\quad 8{,}977 \\ \hline 26{,}899 \end{array} \qquad\qquad \begin{array}{r} 66{,}180 \\ -\quad 7{,}293 \\ \hline 58{,}887 \end{array}$$

2.

$$\begin{array}{r} 92{,}309 \\ -\quad 8{,}958 \\ \hline 83{,}351 \end{array} \qquad\qquad \begin{array}{r} 86{,}583 \\ -\quad 5{,}999 \\ \hline 80{,}584 \end{array}$$

3.

$$\begin{array}{r} 78{,}253 \\ -\quad 9{,}682 \\ \hline 68{,}571 \end{array} \qquad\qquad \begin{array}{r} 34{,}818 \\ -\quad 5{,}847 \\ \hline 28{,}971 \end{array}$$

If you have less than 5 correct, see your instructor for additional help.

Activity 6 - Subtracting Whole Numbers

(52) Directions: Subtract and check.

1.
$$\begin{array}{rcrcr} 82{,}609 & \qquad & 68{,}247 & \qquad & 70{,}909 \\ -\ 52{,}403 & & -\ 44{,}395 & & -\ 69{,}090 \\ \hline 30{,}206 & & 23{,}852 & & 1{,}819 \end{array}$$

2.
$$\begin{array}{rcrcr} 74{,}925 & \qquad & 53{,}286 & \qquad & 42{,}755 \\ -\ 23{,}936 & & -\ 43{,}689 & & -\ 22{,}697 \\ \hline 50{,}989 & & 9{,}597 & & 20{,}058 \end{array}$$

3.
$$\begin{array}{rcrcr} 16{,}973 & \qquad & 17{,}856 & \qquad & 13{,}291 \\ -\ 15{,}998 & & -\ 13{,}201 & & -\ 12{,}986 \\ \hline 975 & & 4{,}655 & & 305 \end{array}$$

If you have less than 7 correct, see your instructor for additional help.

Cluster
Applied Math

Activity 6 - Subtracting Whole Numbers

(53) Directions: Subtract and check.

1.
$$\begin{array}{r} 91{,}527 \\ -\ 20{,}415 \\ \hline 71{,}112 \end{array} \qquad \begin{array}{r} 87{,}496 \\ -\ 32{,}422 \\ \hline 55{,}074 \end{array} \qquad \begin{array}{r} 47{,}086 \\ -\ 17{,}025 \\ \hline 30{,}061 \end{array}$$

2.
$$\begin{array}{r} 33{,}619 \\ -\ 14{,}550 \\ \hline 19{,}069 \end{array} \qquad \begin{array}{r} 10{,}254 \\ -\ 10{,}168 \\ \hline 86 \end{array} \qquad \begin{array}{r} 71{,}528 \\ -\ 20{,}843 \\ \hline 50{,}685 \end{array}$$

3.
$$\begin{array}{r} 17{,}436 \\ -\ 17{,}350 \\ \hline 86 \end{array} \qquad \begin{array}{r} 42{,}981 \\ -\ 31{,}996 \\ \hline 10{,}985 \end{array} \qquad \begin{array}{r} 43{,}216 \\ -\ 21{,}402 \\ \hline 21{,}814 \end{array}$$

If you have less than 7 correct, see your instructor for additional help.

Activity 6 - Subtracting Whole Numbers

(54) Directions: Subtract and check.

1.

$$\begin{array}{rrr} 24,635 & 58,437 & 25,317 \\ -\ 12,759 & -\ 51,679 & -\ 13,658 \\ \hline 11,876 & 6,758 & 11,659 \end{array}$$

2.

$$\begin{array}{rrr} 53,484 & 68,237 & 59,428 \\ -\ 33,251 & -\ 32,025 & -\ 41,314 \\ \hline 20,233 & 36,212 & 18,114 \end{array}$$

3.

$$\begin{array}{rrr} 53,644 & 37,562 & 75,826 \\ -\ 43,827 & -\ 12,245 & -\ 23,521 \\ \hline 9,817 & 25,317 & 52,305 \end{array}$$

If you have less than 7 correct, see your instructor for additional help.

Cluster
Applied Math

Activity 6 - Subtracting Whole Numbers

(55) Directions: Subtract and check.

1.

$$\begin{array}{r} 22{,}483 \\ -\ 19{,}584 \\ \hline 2{,}899 \end{array} \qquad \begin{array}{r} 62{,}537 \\ -\ 56{,}849 \\ \hline 5{,}688 \end{array} \qquad \begin{array}{r} 55{,}130 \\ -\ 43{,}273 \\ \hline 11{,}857 \end{array}$$

2.

$$\begin{array}{r} 86{,}947 \\ -\ 32{,}825 \\ \hline 54{,}122 \end{array} \qquad \begin{array}{r} 56{,}739 \\ -\ 54{,}231 \\ \hline 2{,}508 \end{array} \qquad \begin{array}{r} 92{,}465 \\ -\ 22{,}143 \\ \hline 70{,}322 \end{array}$$

3.

$$\begin{array}{r} 54{,}278 \\ -\ 32{,}489 \\ \hline 21{,}789 \end{array} \qquad \begin{array}{r} 45{,}118 \\ -\ 21{,}279 \\ \hline 23{,}839 \end{array} \qquad \begin{array}{r} 25{,}614 \\ -\ 16{,}726 \\ \hline 8{,}888 \end{array}$$

If you have less than 7 correct, see your instructor for additional help.

Activity 6 - Subtracting Whole Numbers

(56) Directions: Subtract and check.

1.
$$\begin{array}{r} 40{,}007 \\ -\ \underline{23{,}564} \\ 16{,}443 \end{array} \qquad \begin{array}{r} 80{,}006 \\ -\ \underline{51{,}288} \\ 28{,}718 \end{array} \qquad \begin{array}{r} 70{,}003 \\ -\ \underline{29{,}436} \\ 40{,}567 \end{array}$$

2.
$$\begin{array}{r} 30{,}050 \\ -\ \underline{23{,}972} \\ 6{,}078 \end{array} \qquad \begin{array}{r} 60{,}010 \\ -\ \underline{41{,}237} \\ 18{,}773 \end{array} \qquad \begin{array}{r} 80{,}020 \\ -\ \underline{25{,}146} \\ 54{,}874 \end{array}$$

3.
$$\begin{array}{r} 50{,}400 \\ -\ \underline{23{,}872} \\ 26{,}528 \end{array} \qquad \begin{array}{r} 60{,}050 \\ -\ \underline{20{,}743} \\ 39{,}307 \end{array} \qquad \begin{array}{r} 50{,}002 \\ -\ \underline{23{,}875} \\ 26{,}127 \end{array}$$

If you have less than 7 correct, see your instructor for additional help.

Activity 6 - Subtracting Whole Numbers

(57) Directions: Subtract and check.

1.

$$\begin{array}{rrr} 20{,}000 & \qquad 40{,}000 & \qquad 30{,}000 \\ -\ \underline{18{,}954} & \qquad -\ \underline{25{,}364} & \qquad -\ \underline{11{,}456} \\ 1{,}046 & \qquad 14{,}636 & \qquad 18{,}544 \end{array}$$

2.

$$\begin{array}{rrr} 80{,}500 & \qquad 20{,}600 & \qquad 40{,}800 \\ -\ \underline{54{,}378} & \qquad -\ \underline{19{,}644} & \qquad -\ \underline{21{,}953} \\ 26{,}122 & \qquad 956 & \qquad 18{,}847 \end{array}$$

3.

$$\begin{array}{rrr} 50{,}000 & \qquad 70{,}000 & \qquad 70{,}300 \\ -\ \underline{23{,}812} & \qquad -\ \underline{42{,}307} & \qquad -\ \underline{25{,}638} \\ 26{,}188 & \qquad 27{,}693 & \qquad 44{,}662 \end{array}$$

If you have less than 7 correct, see your instructor for additional help.

Activity 6 - Subtracting Whole Numbers

(58) Directions: Subtract and check.

1.

$$\begin{array}{r} 237{,}646 \\ -\ \underline{198{,}759} \\ 38{,}887 \end{array} \qquad \begin{array}{r} 568{,}953 \\ -\ \underline{454{,}005} \\ 114{,}948 \end{array}$$

2.

$$\begin{array}{r} 868{,}753 \\ -\ \underline{789{,}964} \\ 78{,}789 \end{array} \qquad \begin{array}{r} 738{,}659 \\ -\ \underline{699{,}899} \\ 38{,}760 \end{array}$$

3.

$$\begin{array}{r} 543{,}950 \\ -\ \underline{418{,}513} \\ 125{,}437 \end{array} \qquad \begin{array}{r} 437{,}032 \\ -\ \underline{214{,}877} \\ 222{,}155 \end{array}$$

If you have less than 5 correct, see your instructor for additional help.

Activity 6 - Subtracting Whole Numbers

(59) Directions: Subtract and check.

1.

$$\begin{array}{r} 144{,}480 \\ -\ 142{,}895 \\ \hline 1{,}585 \end{array} \qquad \begin{array}{r} 738{,}259 \\ -\ 589{,}767 \\ \hline 148{,}492 \end{array}$$

2.

$$\begin{array}{r} 923{,}644 \\ -\ 849{,}357 \\ \hline 74{,}287 \end{array} \qquad \begin{array}{r} 482{,}637 \\ -\ 297{,}148 \\ \hline 185{,}489 \end{array}$$

3.

$$\begin{array}{r} 834{,}124 \\ -\ 535{,}217 \\ \hline 298{,}907 \end{array} \qquad \begin{array}{r} 685{,}978 \\ -\ 498{,}369 \\ \hline 187{,}609 \end{array}$$

If you have less than 5 correct, see your instructor for additional help.

Activity 6 - Subtracting Whole Numbers

(60) Directions: Subtract and check.

1.

$$\begin{array}{r} 822{,}472 \\ -\ 631{,}584 \\ \hline 190{,}888 \end{array} \qquad\qquad \begin{array}{r} 673{,}612 \\ -\ 297{,}641 \\ \hline 375{,}971 \end{array}$$

2.

$$\begin{array}{r} 421{,}276 \\ -\ 311{,}043 \\ \hline 110{,}233 \end{array} \qquad\qquad \begin{array}{r} 477{,}563 \\ -\ 251{,}412 \\ \hline 226{,}151 \end{array}$$

3.

$$\begin{array}{r} 568{,}798 \\ -\ 325{,}416 \\ \hline 243{,}382 \end{array} \qquad\qquad \begin{array}{r} 874{,}395 \\ -\ 211{,}243 \\ \hline 663{,}152 \end{array}$$

If you have less than 5 correct, see your instructor for additional help.

Activity 6 - Subtracting Whole Numbers

(61) Directions: Subtract and check.

1. $$\begin{array}{r} 688{,}540 \\ -\ 287{,}430 \\ \hline 401{,}110 \end{array} \qquad \begin{array}{r} 628{,}345 \\ -\ 125{,}214 \\ \hline 503{,}131 \end{array}$$

2. $$\begin{array}{r} 787{,}445 \\ -\ 257{,}312 \\ \hline 530{,}133 \end{array} \qquad \begin{array}{r} 255{,}694 \\ -\ 241{,}454 \\ \hline 14{,}240 \end{array}$$

3. $$\begin{array}{r} 923{,}457 \\ -\ 902{,}133 \\ \hline 21{,}324 \end{array} \qquad \begin{array}{r} 860{,}956 \\ -\ 360{,}224 \\ \hline 500{,}732 \end{array}$$

If you have less than 5 correct, see your instructor for additional help.

Activity 6 - Subtracting Whole Numbers

(62) Directions: Subtract and check.

1.

$$\begin{array}{r} 800{,}100 \\ -\ 488{,}326 \\ \hline 311{,}774 \end{array} \qquad \begin{array}{r} 600{,}040 \\ -\ 357{,}926 \\ \hline 242{,}114 \end{array}$$

2.

$$\begin{array}{r} 543{,}900 \\ -\ 418{,}513 \\ \hline 125{,}387 \end{array} \qquad \begin{array}{r} 430{,}032 \\ -\ 214{,}877 \\ \hline 215{,}155 \end{array}$$

3.

$$\begin{array}{r} 510{,}087 \\ -\ 376{,}468 \\ \hline 133{,}619 \end{array} \qquad \begin{array}{r} 260{,}930 \\ -\ 197{,}895 \\ \hline 63{,}035 \end{array}$$

If you have less than 5 correct, see your instructor for additional help.

Activity 6 - Subtracting Whole Numbers

(63) Directions: Subtract and check.

1.

$$\begin{array}{r} 500{,}003 \\ -\ \ 254{,}371 \\ \hline 245{,}632 \end{array} \qquad\qquad \begin{array}{r} 900{,}205 \\ -\ \ 576{,}138 \\ \hline 324{,}067 \end{array}$$

2.

$$\begin{array}{r} 400{,}180 \\ -\ \ 198{,}765 \\ \hline 201{,}415 \end{array} \qquad\qquad \begin{array}{r} 760{,}004 \\ -\ \ 378{,}274 \\ \hline 381{,}730 \end{array}$$

3.

$$\begin{array}{r} 300{,}006 \\ -\ \ 178{,}928 \\ \hline 121{,}078 \end{array} \qquad\qquad \begin{array}{r} 877{,}001 \\ -\ \ 497{,}853 \\ \hline 379{,}148 \end{array}$$

If you have less than 5 correct, see your instructor for additional help.

Activity 6 - Subtracting Whole Numbers

(64) Directions: Subtract and check.

1.

$$\begin{array}{r} 700{,}000 \\ -\ 491{,}297 \\ \hline 208{,}703 \end{array} \qquad\qquad \begin{array}{r} 300{,}000 \\ -\ 207{,}605 \\ \hline 92{,}395 \end{array}$$

2.

$$\begin{array}{r} 604{,}000 \\ -\ 258{,}991 \\ \hline 345{,}009 \end{array} \qquad\qquad \begin{array}{r} 501{,}000 \\ -\ 283{,}430 \\ \hline 217{,}570 \end{array}$$

3.

$$\begin{array}{r} 320{,}000 \\ -\ 102{,}533 \\ \hline 217{,}467 \end{array} \qquad\qquad \begin{array}{r} 700{,}300 \\ -\ 489{,}714 \\ \hline 210{,}586 \end{array}$$

If you have less than 5 correct, see your instructor for additional help.

Activity 6 - Subtracting Whole Numbers

(65) Directions: Subtract and check.

1.
$$\begin{array}{r} 200{,}000 \\ -\ 120{,}432 \\ \hline 79{,}568 \end{array} \qquad\qquad \begin{array}{r} 500{,}000 \\ -\ 418{,}950 \\ \hline 81{,}050 \end{array}$$

2.
$$\begin{array}{r} 403{,}000 \\ -\ 202{,}076 \\ \hline 200{,}924 \end{array} \qquad\qquad \begin{array}{r} 302{,}000 \\ -\ 106{,}432 \\ \hline 195{,}568 \end{array}$$

3.
$$\begin{array}{r} 800{,}000 \\ -\ 326{,}175 \\ \hline 473{,}825 \end{array} \qquad\qquad \begin{array}{r} 107{,}000 \\ -\ 98{,}416 \\ \hline 8{,}584 \end{array}$$

If you have less than 5 correct, see your instructor for additional help.

Activity 7 - Calculating the Range of Whole Numbers (continued)

Directions: Underline the largest and the smallest number in each row below. Calculate the range of each row of numbers and write your answer in the blank.

					Range
A)	18	12	14	16	6
B)	21	27	23	25	6
C)	6	2	8	4	6
D)	9	7	5	3	6
E)	44	48	42	40	8
F)	33	35	32	36	4
G)	51	50	53	57	7
H)	17	11	6	3	14
I)	33	13	22	11	22
J)	213	266	245	202	64

If you have less than 24 correct, see your instructor for additional help.

Activity 7 - Calculating the Range of Whole Numbers (continued)

Directions: Calculate the range.

1. Find the range of the following oil readings:

   4 % 11 % 10 % 8 % 13 %

   Range: 9 %

2. Find the range of the following bag weights:

   18 oz. 17 oz. 14 oz. 12 oz. 10 oz.

   Range: 8 oz.

3. Calculate the range of the following wet weights:

   A) 74 69 67 Range: 7

   B) 76 72 67 Range: 9

   C) 69 72 68 Range: 4

   D) 70 74 66 Range: 8

   E) 76 75 65 Range: 11

4. Find the range of these oven temperatures:

   A) 410° 580° 550° 520° 415° 330° 420° 450°

   Range: 250°

   B) 350° 500° 510° 400° 340° 360° 300° 320°

   Range: 210°

If you have less than 7 correct, see your instructor for additional help.

Activity 9 - Subtracting Whole Numbers (Word Problems)

Directions: Use subtraction to solve the following problems:

1. Suppose lines 8 and 9 in a bakery produce Snackwells®. The total number of units produced daily is 32,988. Line 9 produces 18,752 units per day. How many units are produced by Line 8?

   Answer: 14,236

2. The total package weight of a box of Cheese Nips® is 383 grams. The tare weight is 73 grams. What is the net weight?

   Answer: 310

3. The total package weight of a package of Chips Ahoy!® is 18 ounces. The packaging tare is 2 ounces. What is the net weight?

   Answer: 16

4. The total package weight of a box of Premium® crackers is 16 ounces. The tare weight is 3 ounces. What is the actual product weight?

   Answer: 13

5. One Thursday, shift 2 produced 634 doughs and shift 3 produced 527 doughs. How many more doughs did shift 2 produce than shift 3?

   Answer: 107

6. On Wednesday, shift 1 produced 694 pounds of B&R and shift 2 produced 447 pounds of B&R. How much more B&R was produced by shift 1 than by shift 2?

   Answer: 247

Activity 9 - Subtracting Whole Numbers (Word Problems) (continued)

7. On Friday, three shifts produced Oreos®. Shift 3 produced 9,298 units, shift 1 produced 9,986 units, and shift 2 produced 8,897 units.

   A) How many more units did shift 1 produce than shift 3?

   Answer: 688

   B) How many more units did shift 1 produce than shift 2?

   Answer: 1,089

   C) How many more units did shift 3 produce than shift 2?

   Answer: 401

8. Find the following product weights:

   A) 178g of product; 10g of packaging material

   product weight: 168g

   B) 249g of product; 13g of packaging material

   product weight: 236g

   C) 254g of product; 12g of packaging material

   product weight: 242g

   D) 12 oz. of product, 2 oz. of packaging material

   product weight: 10 oz.

   E) 22 oz. of product; 4 oz. of packaging material

   product weight: 18 oz.

If you have less than 11 correct, see your instructor for additional help.

Activity 10 - Decimal Place Values/Reading and Writing Decimals (continued)

Directions: Before starting this exercise, read aloud to the instructor the decimals listed below. Write the place name of the last digit in each decimal in the blank provided. Underline all the digits that represent less than a whole.

(1) 29.3 tenths

(2) 679.23 hundredths

(3) 51.084 thousandths

(4) 392.19 hundredths

(5) 500.453 thousandths

(6) 14.7 tenths

(7) 38.22 hundredths

(8) 142.002 thousandths

(9) 25.6341 ten thousandths

(10) 12.36 hundredths

If you have less than 16 correct, see your instructor for additional help.

Activity 10 - Decimal Place Values/Reading and Writing Decimals (continued)

Directions: Rewrite the numbers below as decimals. When you've completed the exercise, read the decimals aloud to the instructor.

(1) twenty-seven and eight tenths 27.8

(2) forty-five and sixty-three hundredths 45.63

(3) nineteen and two hundred forty-two thousandths 19.242

(4) twenty-five and thirty-four ten thousandths 25.0034

(5) fifty and thirty-three thousandths 50.033

(6) eighty-one hundredths .81

(7) three and five tenths 3.5

(8) one hundred thirty-seven thousandths .137

(9) twelve and fifteen thousand six hundred twenty-five hundred-thousandths 12.15625

(10) eight hundred seventy-five ten-thousandths .0875

If you have less than 8 correct, see your instructor for additional help.

Activity 10 - Decimal Place Values/Reading and Writing Decimals

Directions: Write the following decimals in words.

(1) .8 eighth tenths

(2) .09 nine hundredths

(3) .378 three hundred seventy-eight thousandths

(4) 10.475 ten and four hundred seventy-five thousandths

(5) .0028 twenty-eight ten-thousandths

(6) 8.000326 eight and three hundred twenty-six millionths

(7) 19.55 nineteen and fifty-five hundredths

(8) .0041 forty-one ten-thousandths

(9) .000208 two hundred eight millionths

(10) 16.013 sixteen and thirteen thousandths

If you have less than 8 correct, see your instructor for additional help.

Activity 11 - Adding Decimals (continued)

Directions: Add.

1.	$\begin{array}{r} .6 \\ .5 \\ .1 \\ \hline 1.2 \end{array}$	$\begin{array}{r} .3 \\ .2 \\ .4 \\ \hline .9 \end{array}$	$\begin{array}{r} .9 \\ .7 \\ .8 \\ \hline 2.4 \end{array}$	$\begin{array}{r} .1 \\ .4 \\ .7 \\ \hline 1.2 \end{array}$
2.	$\begin{array}{r} .2 \\ .4 \\ .6 \\ \hline 1.2 \end{array}$	$\begin{array}{r} .3 \\ .5 \\ .7 \\ \hline 1.5 \end{array}$	$\begin{array}{r} .4 \\ .6 \\ .8 \\ \hline 1.8 \end{array}$	$\begin{array}{r} .5 \\ .7 \\ .9 \\ \hline 2.1 \end{array}$
3.	$\begin{array}{r} .10 \\ .15 \\ .20 \\ \hline .45 \end{array}$	$\begin{array}{r} .12 \\ .14 \\ .16 \\ \hline .42 \end{array}$	$\begin{array}{r} .19 \\ .17 \\ .14 \\ \hline .50 \end{array}$	$\begin{array}{r} .13 \\ .16 \\ .18 \\ \hline .47 \end{array}$
4.	$\begin{array}{r} .11 \\ .32 \\ .54 \\ \hline .97 \end{array}$	$\begin{array}{r} .15 \\ .28 \\ .45 \\ \hline .88 \end{array}$	$\begin{array}{r} .22 \\ .73 \\ .47 \\ \hline 1.42 \end{array}$	$\begin{array}{r} .19 \\ .37 \\ .51 \\ \hline 1.07 \end{array}$

If you have less than 13 correct, see your instructor for additional help.

Activity 11 - Adding Decimals (continued)

Directions: Add.

1.	.4	.9	.1	.8
	.7	.5	.6	.4
	8.7	4.3	3.2	6.5
	9.8	5.7	3.9	7.7
2.	9.3	2.3	4.8	7.6
	17.7	18.6	16.4	15.2
	74.2	62.7	88.5	53.9
	101.2	83.6	109.7	76.7
3.	76.8	32.5	67.9	35.7
	119.42	321.26	392.28	231.09
	24.4	29.3	21.8	10.6
	220.62	383.06	481.98	277.39
4.	3.8	5.7	4.5	3.2
	2.1	3.2	1.3	2.5
	5.9	8.9	5.8	5.7

If you have less than 13 correct, see your instructor for additional help.

Activity 11 - Adding Decimals (continued)

Directions: Add.

1.	9.3	2.6	2.9	8.3
	1.4	5.3	8.4	9.9
	10.7	7.9	11.3	18.2
2.	3.02	7.29	6.55	4.69
	8.3	5.0	4.3	6.4
	11.32	12.29	10.85	11.09
3.	.412.8	.574.1	.23	.64
	9	8	7.08	3.77
	3.30	4.75	7.31	4.41
4.	.32	.13	.47	.16
	9.46	2.06	5.32	4.82
	9.78	2.19	5.79	4.98

If you have less than 13 correct, see your instructor for additional help.

Activity 11 - Adding Decimals (continued)

Directions: Add.

1.	6.6 .81 .056 7.466	2.1 .49 .043 2.633	8.9 .67 .039 9.609	9.2 .10 .500 9.800
2.	60.3 2.85 5.77 68.92	.870 1.54 725.07 3 727.48 3	194.7 84.02 9.006 287.72 6	6.57 29.35 1.7 37.62
3.	14.6 .73 7.18 22.51	24.3 .10 25.67 50.07	8.80 7.7 52.3 68.80	.223 20.9 57.46 78.583
4.	.817 6.465 3.73 11.012	62.1 8.97 .973 72.043	.526 6.83 3.4 10.756	62.1 8.97 .9730 72.043 0

If you have less than 13 correct, see your instructor for additional help.

Activity 11 - Adding Decimals (continued)

Directions: Calculate the following sums.

1. 5,342.1 + 367.22 = 5,709.32

2. 29 + 32.43 + 236.211 + 10.32 = 307.961

3. Following are net weights for 18-ounce packages of Chips Ahoy!® What is the total net weight for these six packages?

   Answer: 110.5 ounces

   17.9 18.2 18.4 18.7 18.5 18.8

4. Following are the net weights for 13.5-ounce boxes of Cheese Nips®. What is the total net weight for these 4 boxes?

   Answer: 53.403 ounces

   13.383 13.501 13.496 13.023

5. Following are the slug weights for six Chips Ahoy!® slugs. What is the total weight of the slugs?

   Answer: 1,542.9 grams

   255.3249.1254.6264.4257.8261.7

Activity 12 - Rounding Decimals

Directions: Round the numbers as indicated below.

1. Round the net weight of this product to he nearest tenth.

16.37 ounces Answer: 16.4 ounces

2. Round the product moisture to the nearest tenth and the nearest hundredth.

4.172% Answer: 4.2 % (tenth)
Answer: 4.17% (hundredth)

3. Round the slug weight to the nearest tenth and the nearest one.

254.65 grams Answer: 254.7 grams (tenth)
Answer: 255 grams (one)

4. Round the following number to the nearest ten thousandth, thousandth, and hundredth.

.01525 Answer: .0153 (ten thousandth)
Answer: .015 (thousandth)
Answer: .02 (hundredth)

If you have less than 6 correct, see your instructor for additional help.

Activity 12 - Rounding Decimals

Directions: Round the following decimals to the nearest tenth:

1) 4.57 4.6

2) 2.52 2.5

3) 1.85 1.9

4) 12.04 12 [12.0]

5) .68 .7

Directions: Round the following decimals to the nearest hundredth:

6) 9.048 9.05

7) 7.563 7.56

8) 2.497 2.50

9) 3.299 3.30

10) .485 .49

Directions: Round the following decimals to the nearest thousandth.

11) 5.1836 5.184

12) 7.4889 7.489

13) 1.6378 1.638

14) .2546 .255

15) .1168 .117

If you have less than 12 correct, see your instructor for additional help.

Activity 13 - Subtracting Decimals

Directions: Find the differences in the problems below.

(1) 6.2 - 3.76 = 2.44

(2) 45.92 - 23.07 = 22.85

(3) 5 - 2.493 = 2.507

(4) 382 - 46.20 = 335.8

(5) 12 - .936 = 11.064

(6) 835.091 - 482.320 = 352.771

(7) 3.2 - .1986 = 3.0014

(8) 78 - 35.83 = 42.17

(9) 29.34 - 16.52 = 12.82

(10) .07 - .002 = .068

(11) 1 - .047 = .953

(12) .47 - .3992 = .0708

(13) 89.3 - .764 = 88.536

(14) 963.857 - 241.534 = 722.323

If you have less than 11 correct, see your instructor for additional help.

Activity 13 - Subtracting Decimals

Directions: Find the difference in the following problems.

1. 93.7 - 39.48 = 54.22

2. 3,724.266 - 859.001 = 2,865.265

3. Calculate the net weight of a box of Better Cheddars®:
   Total package weight (ounces): 9.86; Tare weight (ounces): 1.3

   Net weight: 8.56 ounces

4. Calculate the net weight of a box of Honey Maid Graham Crackers®:
   Total package weight (ounces): 17.6; Tare weight (ounces): 1.28

   Net weight: 16.32 ounces

5. Suppose the wet weight of a Premium® cracker sample is 89.8 grams. The dry weight is 86.45 grams. What is the difference between the wet and dry weights?

   3.35 grams

6. On Thursday, shift 1 produced 646.99 pounds of B&R and shift 2 produced 972.5 pounds. How much more B&R was produced by shift 2 than by shift 1?
   325.51 pounds

7. The average number of Oreo® units produced per day on shift 1 is 4,000.58. The average number of Oreo® units produced per day on shift 2 is 3,895.6. On average, how many more units does shift 1 produce than shift 2?

   104.98 units

If you have less than 6 correct, see your instructor for additional help.

Activity 14 - Comparing Decimals

Directions: Write the larger decimal of each pair in the blank below.

(1)	.502	.52	.52
(2)	.17	.21	.21
(3)	.6	.06	.6
(4)	.400	.500	.500
(5)	.30	.90	.90
(6)	.4	.45	.45
(7)	.57	.06	.57
(8)	.7	.2	.7
(9)	.14	.41	.41
(10)	.83	.8	.83

If you have less than 8 correct, see your instructor for additional help.

Activity 14 - Comparing Decimals

Objective(s): This activity will enable participants to compare decimals.

Materials Required:
Pencil

You need to know: To compare decimals.....

1. Compare the digits to the left of the decimal point as whole numbers. If one whole number is larger, then that decimal is larger.

   EXAMPLE Compare: 427.36 with 425.263

   427 is larger than 425; therefore 427.36 is larger than 425.263.

2. When the whole numbers in decimals are equal, compare the first digit to the right of the decimal point. If one digit is larger, then that decimal is larger.

   You may give each decimal compared the same number of places by writing in zeros, if necessary. By using zeros as placeholders, you are giving each decimal a common denominator.

   EXAMPLE Compare: 18.331 with 18.47
   (18.331 with 18.47**0**)

   The whole numbers are identical (18 and 18). Four (4) is larger than 3; therefore, 18.47 is larger than 18.331.

3. If the digits in the first place to the right of the decimal point (tenths) are the same, then compare the next place to the right (hundredths). If one digit is larger, then that decimal is larger.

   EXAMPLE Compare: 1.486 with 1.49
   (1.486 with 1.49**0**)

   The whole numbers are identical (1 and 1). The digits in the first place to the right of the decimal point are the same (4 and 4). Nine (9) is larger than 8; therefore, 1.49 is larger than 1.486.

Activity 14 - Comparing Decimals

Directions: Write the larger decimal of each pair in the blank below.

(1)	.502	.52	.52
(2)	.17	.21	.21
(3)	.6	.06	.6
(4)	.400	.500	.500
(5)	.30	.90	.90
(6)	.4	.45	.45
(7)	.57	.06	.57
(8)	.7	.2	.7
(9)	.14	.41	.41
(10)	.83	.8	.83

If you have less than 8 correct, see your instructor for additional help.

Activity 15 - Calculating Range Using Decimals

Directions: Circle the largest and the smallest number in each row below. Calculate the range of each row of numbers and write your answer in the blank.

					Range
A)	16.8	16.08	15.1	15.11	1.69
B)	16.3	16.1	15.8	15.9	.5
C)	19.85	20.00	19.75	20.71	.96
D)	243.7	243.17	242.00	243.00	1.7
E)	41.0	41.3	40.0	41.6	1.6
F)	6.8	7.2	6.9	7.6	.8
G)	1.6	1.2	.8	1.0	.8
H)	3.07	3.04	3.09	3.03	.06
I)	15.85	15.90	16.05	16.25	.4
J)	19.2	19.8	20.4	20.8	1.6

If you have less than 24 correct, see your instructor for additional help.

Activity 15 - Calculating Range Using Decimals

Directions: Circle the largest and the smallest number in each row below. Calculate the range of each row of numbers and write your answer in the blank.

					Range
A)	17.8	17.08	17.1	17.11	.72
B)	43	43.1	40	43.01	3.1
C)	234.9	234.19	233	234	1.9
D)	16.91	17.1	16.98	17.09	.19
E)	23.16	22.93	23.61	23.094	.68
F)	18.33	18.32	18.28	18.23	.10
G)	51.98	51.	51.9	51.89	.09
H)	46.7	46.71	46.75	46.78	.08
I)	19.75	19.80	20.00	19.85	.25
J)	34.99	34.9	35	35.72	.82

If you have less than 24 correct, see your instructor for additional help.

Activity 16 - Multiplying Decimals

(1) Directions: Find the following products.

1. 1.14 x .8 = .912

2. .23 x .47 = .1081

3. 6.59 x .701 = 4.61959

4. Suppose you make $16.75 per hour. Last week you worked 39.5 hours. What will be your gross wages for the week?

   $ 661.625 ($ 661.63)

5. The net weight of a box of crackers is 13.5 ounces. Assuming that all boxes have the same net weights, how much will 12 boxes weigh?

   162 ounces

If you have less than 4 correct, see your instructor for additional help.

Activity 16 - Multiplying Decimals

(2) Directions: Multiply.

1.
$$\begin{array}{r} 34.7 \\ \times \quad 8 \\ \hline 277.6 \end{array} \qquad \begin{array}{r} 2.89 \\ \times \quad 7 \\ \hline 20.23 \end{array} \qquad \begin{array}{r} .551 \\ \times \quad 6 \\ \hline 3.306 \end{array} \qquad \begin{array}{r} 60.3 \\ \times \quad 9 \\ \hline 542.7 \end{array} \qquad \begin{array}{r} 7.18 \\ \times \quad 4 \\ \hline 28.72 \end{array}$$

2.
$$\begin{array}{r} 3.8 \\ \times \quad 4 \\ \hline 15.2 \end{array} \qquad \begin{array}{r} .92 \\ \times \quad 9 \\ \hline 8.28 \end{array} \qquad \begin{array}{r} 6.7 \\ \times \quad 6 \\ \hline 40.2 \end{array} \qquad \begin{array}{r} 5.3 \\ \times \quad 8 \\ \hline 42.4 \end{array} \qquad \begin{array}{r} .84 \\ \times \quad 7 \\ \hline 5.88 \end{array}$$

3.
$$\begin{array}{r} 41 \\ \times \ .03 \\ \hline 1.23 \end{array} \qquad \begin{array}{r} 78 \\ \times \quad .5 \\ \hline 39 \end{array} \qquad \begin{array}{r} 59 \\ \times \ .09 \\ \hline 5.31 \end{array} \qquad \begin{array}{r} 86 \\ \times \quad .4 \\ \hline 34.4 \end{array} \qquad \begin{array}{r} 19 \\ \times \ .06 \\ \hline 1.14 \end{array}$$

If you have less than 12 correct, see your instructor for additional help.

Activity 16 - Multiplying Decimals

(3) Directions: Find the products in the problems below.

1.
$$\begin{array}{rcrcrcrcr} .09 & \quad & .05 & \quad & .004 & \quad & .08 & \quad & .002 \\ \text{x}\ \ .6 & & \text{x}\ \ .7 & & \text{x}\ \ .3 & & \text{x}\ .04 & & \text{x}\ \ .8 \\ \hline .054 & & .035 & & .0012 & & .0032 & & .0016 \end{array}$$

2.
$$\begin{array}{rcrcrcrcr} 2.8 & \quad & 5.6 & \quad & .72 & \quad & .81 & \quad & .94 \\ \text{x}\ 4.3 & & \text{x}\ .82 & & \text{x}\ 5.7 & & \text{x}\ .69 & & \text{x}\ 1.8 \\ \hline 12.04 & & 4.592 & & 4.104 & & .5589 & & 1.692 \end{array}$$

3.
$$\begin{array}{rcrcrcrcr} 41.8 & \quad & 3.90 & \quad & .516 & \quad & 73.8 & \quad & 3.47 \\ \text{x}\ \ .7 & & \text{x}\ .08 & & \text{x}\ \ .5 & & \text{x}\ .06 & & \text{x}\ \ .4 \\ \hline 29.26 & & .312 & & .258 & & 4.428 & & 1.388 \end{array}$$

If you have less than 12 correct, see your instructor for additional help.

Cluster
Applied Math

Activity 16 - Multiplying Decimals

(4) Directions: Multiply.

1.	5.6 x .2 1.12	.73 x .08 .0584	9.2 x .7 6.44	.087 x .4 .0348	3.3 x .06 .198
2.	30.5 x .27 8.235	7.40 x 6.6 48.84	61.8 x 4.8 296.64	.514 x .91 .46774	9.06 x 7.3 66.138
3.	906 63.42	504 x .002 1.008	783 x .8 626.4	652 x .06 39.12	467 x .003 1.401

If you have less than 12 correct, see your instructor for additional help.

Activity 16 - Multiplying Decimals

(5) Directions: Multiply.

1.	.02	.25	1.2	.073
	x .8	x .04	x .008	x .05
	.016	.01	.0096	.00365
2.	14.21	.216	17.7	3.2
	x 35	x .24	x 2.5	x 87
	497.35	.05184	44.25	278.4
3.	547.1	3.07	17.39	1.754
	x .73	x 731	x 12.4	x .23
	399.383	2,244.17	215.636	.40342
4.	4.08	.0125	.468	.12121
	x .0017	x .315	x .1302	x .03
	.006936	.0039375	.0609336	.0036363

If you have less than 13 correct, see your instructor for additional help.

Activity 16 - Multiplying Decimals

(6) Directions: Multiply.

1.	17.32 x .16 2.7712	.0648 x 2.3 .14904	913.2 x .049 44.7468	40.21 x 20.8 836.368
2.	45.21 x 5.6 253.176	3.748 x 73 273.604	206.9 x .28 57.932	.7488 x 4.9 3.66912
3.	.2789 x .17 .047413	3.845 x 29.2 112.274	5183.6 x .0016 8.29376	303.003 x 56.8 17,210.57

If you have less than 10 correct, see your instructor for additional help.

Activity 16 - Multiplying Decimals By 10, 100, or 1,000

(7) Directions: Use the shortcut to multiply each of the following problems.

1. 10 x 7.6 = 76
2. 100 x .013 = 1.3
3. 10 x 7.64 = 76.4
4. 10 x .013 = .13
5. 10 x .7839 = 7.839
6. 100 x .002 = .2
7. 1,000 x .7839 = 783.9
8. 10 x .9084 = 9.084
9. 1,000 x .7839 = 783.9
10. 1,000 x 908.4 = 908,400
11. 10 x 7.9 = 79
12. 100 x 90.84 = 9,084

If you have less than 10 correct, see your instructor for additional help.

Activity 16 - Multiplying Decimals By 10, 100, or 1,000

(8) Directions: Multiply each of the following problems using the shortcut.

1. .2 x 10 = 2
2. 45.06 x 100 = 4,506
3. 72.4 x 100 = 7,240
4. .35 x 10 = 3.5
5. .539 x 100 = 53.9
6. .457 x 1,000 = 457
7. .05 x 100 = 5
8. 42.4 x 100 = 4,240
9. 86.73 x 1,000 = 86,730
10. 2.97 x 100 = 297
11. 22.8 x 1,000 = 22,800
12. .9 x 1,000 = 900

If you have less than 10 correct, see your instructor for additional help.

Cluster
Applied Math

Activity 16 - Multiplying Decimals By 10, 100, or 1,000

(9) Directions: Multiply each of the following problems using the shortcut.

1) .34 x 10 = 3.4 1.24 x 100 = 124 3.85 x 1,000 = 3,850

2) .03 x 100 = 3.275 x 100 = 27.5 8.9 x 100 = 890

3) .8 x 10 = 8 .09 x 10 = .9 3.64 x 10 = 36.4

4) .9 x 1,000 = 900 2.36 x 1,000 = 2,360 .475 x 1,000 = 475

5) .06 x 1,000 = 60 .863 x 100 = 86.3.721 x 10 = 7.21

6) 1.6 x 1,000 = 1,600

If you have less than 13 correct, see your instructor for additional help.

Activity 17 - Dividing Decimals By 10, 100, or 1,000

Directions: Find the quotients using the shortcut.

1. 7.7 ÷ 10 = .77 .14 ÷ 10 = .014

2. 52.9 ÷ 100 = .529 64.7 ÷ 1,000 = .0647

3. .239 ÷ 1,000 = .000239 58.09 ÷ 1,000 = .05809

4. 8.306 ÷ 100 = .08306 50.73 ÷ 1,000 = .05073

5. .4 ÷ 1,000 = .0004

If you have less than 8 correct, see your instructor for additional help.

Activity 17 - Dividing Decimals By 10, 100, or 1,000

Directions: Find the quotients using the shortcut.

1. .62 ÷ 10 = .062 5.74 ÷ 100 = .0574

2. .3 ÷ 10 = .03 12.09 ÷ 100 = .1209

3. .08 ÷ 100 = .0008 .834 ÷ 100 = .00834

4. 21.6 ÷ 100 = .216 38.6 ÷ 1,000 = .0386

5. 84.7 ÷ 100 = .847

If you have less than 8 correct, see your instructor for additional help.

Activity 19 - Calculating Percent of Oil

All ingredients in a product must be added in the amount specified by the master recipe. By doing so, consistency is maintained in the product and the product complies with labeling information provided for the consumer.

For instance the correct amount of spray oil on a product must be monitored. To perform this calculation you need to take weights, read the scale, subtract, divide, and multiply.

Step 1:
Record the dry weight of the product

Step 2:
Record the wet weight of the product (after the oil spray machine)

Step 3:
Subtract the dry weight from the wet weight

Step 4:
Divide the wet weight into the answer for step 3

Step 5:
Multiply your answer by 100. The answer is the percent of oil in that sample.

Now try the following:

	Wet Wt.	**Dry Wt.**	**% Oil**
1.	50	45	**10%**
2.	69	63	**8.7%**
3.	100	90	**10%**
4.	112	110	**1.8%**

Activity 20 - Calculating Cubic Footage

When working in Environmental Services, an employee must sometimes spray designated areas to prevent infestation. The chemicals must be used according to the label directions for the amount of space to be sprayed. Therefore, the cubic footage of the area to be sprayed must be determined.

To calculate cubic footage you must be able to measure width, length, height and then multiply.

If a room measures 70 feet by 80 feet and is 20 feet high, you multiply.
70 X 80 X 20 = 112,000 cubic feet.

Find the cubic footage of the following rooms.

Room A measures
100 ft. long, 45 ft. wide, 25 feet tall **112,500** cu. ft.

Room B measures
12 ft. wide, 15 ft. long, 8 ft. tall **1,400** cu. ft.

Room C measures
35.5 ft. long, 22.25 ft. wide, 12 ft. tall **9478.5** cu. ft.

Activity 21 - Calculating Sprays

An Environmental Services employee must sometimes use a spraying device for tasks such as administering pesticides. How much liquid you put in the spraying device is determined by the label directions and the amount of area or space to be sprayed.

First, you must calculate the space as you did in the previous activity. Next, you follow label directions, using division to calculate the amount of liquid to pour into the tank.

For instance, if the area to be sprayed is 10,000 cubic feet, and one gallon sprays 5,000 cubic feet, you will need 2 gallons, because

$10,000 \div 5,000 = 2$

Use the room measurements in the previous activity to calculate how many gallons of liquid will be needed if one gallon is necessary for 1000 cubic feet.

Room A **112.5** gallons

Room B **1.44** gallons

Room C **9.5** gallons

Cluster_____

Activity 1: Learning Military Time

Objective (s): This activity will enable participants

1. To become familiar with military time (24 hour clock time)

2. To understand how military time is organized

Materials Used: Pencils, Paper
Military Time Reference Sheet

You Need to Know:

In grade school we were all very proud when we learned how to tell time. We learned the purpose of the minute and hour hands on a regular manual clock. Then the digital display clocks came along and made it even easier for us to tell time.

However, there is another way to express the time of day and that is in military time. Military time denotes the number of hours into a new day and adds "hundred" as a suffix. For example, 12 noon, midday is expressed as 1200 hours - 12 hours into a new day followed by the phrase "hundred hours."

Many companies require that their employees use a "time-clock" that records hours worked in military time. Various areas of the Nabisco Facility use military time. For example, the Mixing Department uses this 24-hour clock method to calculate lay time, which is the time between the mixing and dumping of the dough. On the following page you will find a **Military Time Reference Sheet** that shows the equivalent conventional time. Take a few moments to review that sheet.

MILITARY TIME REFERENCE SHEET

Conventional Time			Military Time
AM	12:00	midnight	2400 hours
	12:01	1-minute past midnight	0001 hours
	12:10	10 minutes past midnight	0010 hours
	1:00	1-O'clock in the morning	0100 hours
	2:00	2-O’clock in the morning	0200 hours
	2:30	2:30 in the morning	0230 hours
	3:00	3-O'clock in the morning	0300 hours
	4:00	4-O’clock in the morning	0400 hours
	5:00	5-O'clock in the morning	0500 hours
	6:00	6-O'clock in the morning	0600 hours
	7:00	7-O'clock in the morning	0700 hours
	8:00	8-O'clock in the morning	0800 hours
	9:00	9-O'clock in the morning	0900 hours
	10:00	10-O'clock in the morning	1000 hours
	11:00	11-O'clock in the morning	1100 hours
PM	12:00	noon, midday	1200 hours
	12:18	18-minutes past noon	1218 hours
	12:45	45-minutes past 12 noon	1245 hours
	1:00	1-O'clock in the afternoon	1300 hours
	1:05	5-minutes after 1 p.m.	1305 hours
	2:00	2-O'clock in the afternoon	1400 hours
	3:00	3-O'clock in the afternoon	1500 hours
	4:00	4-O'clock in the afternoon	1600 hours
	5:00	5-O'clock in the afternoon	1700 hours
	6:00	6-O'clock in the afternoon	1800 hours
	7:00	7-O'clock in the evening	1900 hours
	8:00	8-O'clock in the evening	2000 hours
	9:00	9-O'clock in the evening	2100 hours
	10:00	10-O'clock in the evening	2200 hours
	11:00	11-O'clock in the evening	2300 hours
	11:03	3-minutes past 11 at night	2303 hours
	11:22	22-minutes past 11 at night	2322 hours
	11:47	47 minutes past 11 at night	2347 hours

Activity 2 - Working with the Military Time Reference Sheet

Objective (s): This activity will enable participants

1. To become familiar with military time

2. To understand how military time is organized

Materials Used: Pencils, Paper, Military Time Reference Sheet

Directions

Look at the Military Time Reference Sheet. Observe the progression of the time and hours. For example, 12 noon by conventional time is the same as 1200 (12-hundred) hours in military hours. Locate that time on your reference sheet. The next time on the sheet is 12:18 p.m. or 1218 hours (18 minutes after 12 noon). Now complete the worksheet below by writing in the missing information. You may use your reference sheet.

Military Time Worksheet

Conventional Time			Military Time
AM	12:00	midnight	2400 hours
	12:01	1-minute past midnight	
	12:10	10 minutes past midnight	0010 hours
	1:00	1-O'clock in the morning	
	2:00	2-O'clock in the morning	0200 hours
	2:30	2:30 in the morning	
	3:00	3-O'clock in the morning	0300 hours
	4:00	4-O'clock in the morning	
	5:00	5-O'clock in the morning	
	6:00	6-O'clock in the morning	0600 hours
	7:00	7-O'clock in the morning	
	8:00		
	9:00	9-O'clock in the morning	0900 hours
	10:00	10-O'clock in the morning	
	11:00	11-O'clock in the morning	1100 hours

Activity 2 Continued...

Military Time Worksheet

Conventional Time			Military Time
PM	12:00	noon, midday	1200 hours
	12:18	18-minutes past noon	
	12:45	45-minutes past 12 noon	1245 hours
	1:00	1-O'clock in the afternoon	
	1:05	5-minutes after 1 p.m.	1305 hours
	2:00	2-O'clock in the afternoon	
	3:00		
	4:00	4-O'clock in the afternoon	1600 hours
	5:00	5-O'clock in the afternoon	
	6:00	6-O'clock in the afternoon	1800 hours
	7:00	7-O'clock in the evening	
	18:00	8-O'clock in the evening	2000 hours
	9:00		
	10:00	10-O'clock in the evening	2200 hours
	11:00	11-O'clock in the evening	
	11:03	3-minutes past 11 at night	
	11:22	22-minutes past 11 at night	2322 hours
	11:47		

Activity 3 - Translating Conventional Time to Military Time

Objective (s): This activity will enable participants

1. To record military time

2. To translate conventional time to military time

Materials Used: Pencils, Paper
Military Time Reference Sheet

Directions

Write the correct military time in the blank spaces.

A. **Military Time Translation**

Conventional Time		**Military Time**
AM	12:00	____________
	12:01	____________
	12:10	____________
	1:00	____________
	2:30	____________
	11:00	____________

B.

Military Time Translation

Conventional Time	Military Time
PM 12:00	______________
12:10	______________
1:00	______________
2:00	______________
4:17	______________
11:00	______________

Activity 4 - Using Military Time in the Workplace

Objective (s): This activity will enable participants

1. To record military time

2. To translate conventional time to military time

Materials Used: Pencils, Paper, Military Time Reference Sheet

Directions

Read the work schedule below and write in the military time for the hours sanitation employees must clean the locker rooms and lounges each day. Write the military time in the spaces provided. Use your military reference sheet, if necessary.

Work Schedule

First Shift	Military Time
7:30 a.m.	____________
9:30 a.m.	____________
11:00 a.m.	____________
1:00 p.m.	____________
2:30 p.m.	____________

Activity 4 - Using Military Time in the Workplace

Second Shift

3:30 p.m. ____________

5:30 p.m. ____________

7:30 p.m. ____________

9:00 p.m. ____________

10:30 p.m. ____________

Third Shift

11:30 p.m. ____________

1:30 a.m. ____________

3:30 a.m. ____________

5:30 a.m. ____________

6:30 a.m. ____________

Activity 5 - Recording Military Time

Objective (s): This activity will enable participants

1. To record military time
2. Translate military time to conventional time

Materials Used: Pencils, Paper, Military Time Reference Sheet

Directions

Read the paragraphs below and write in the military time translation for the conventional time noted.

1. Clara plans to purchase a car at Nicker's Chevrolet today. She is going to meet John at 2:35 p.m. at the dealership. How is 2:35 p.m. expressed in military time?_____________.

2. It took 10 hours to produce a cookie. If John started at 7:00 a.m., what time did he finish the process? Write the time he started and the completion time in military time. Start time:__________; Completion time: __________.

3. Jack is interviewing six people for jobs in the bakery. He intends to spend one hour with each person. Jack does not know military time. Help Jack by changing the military time to conventional time.

0900 hours ______________

1100 hours ______________

1400 hours ______________

1800 hours ______________

1900 hours ______________

2100 hours ______________

Activity 6- Using flash cards to learn military time

Objective (s): This activity will enable participants

1. To practice the use of military time
2. To Translate conventional time into military time

Materials Used: Pencils, Paper, Military Time Flash Cards

Directions

Ask your facilitator for a set of flash cards. Take one card from the stack and look at each side. Please note that one side has the conventional time and the other side has the military time. Use the flash cards to challenge yourself. You will need a blank sheet of paper to write your answers. Now, take another card from the stack. Look at the conventional side of the card. Do not look at the nswer on the military side. Write your answers on your sheet of paper. Continue this process until you have selected at least 20 cards. Then check your answers.

Activity 7 - Recording Military Time

Objective (s): This activity will enable participants

1. To record military time
2. Translate conventional time into military time
3. Practice using military time to complete work tasks

Materials Used: Pencils, Paper, Military Time Reference Sheet

Directions

Read the paragraph and write in the military time for the conventional time. Write the translation in the parenthesis provided. Do not use your military reference sheet.

John is a worker in the Mixing Department. On Tuesday, he reports to that department at 5:00 a.m. (__________**hours**). However, he was late and he clocked in at 5:30 a.m. (_______**hours**).

After talking to his supervisor for one half-hour. He actually started work at 6:00 a.m. (________**hours**). His task for the day was to mix dough for Vanilla Wafers. He takes one-hour to mix the dough. It is now 7:00 a.m. (_______**hours**). According to his procedures, the dough must stand for six hours before it is dumped. The dough will be dumped at 1:00 p.m. (_______**hours**).

John Miller clocks out at that time. Therefore, Mary will dump the dough. Mary dumped the dough on time. Then she went to on break at 2:30 p.m. (________**hours**). She returned at 2:45 p.m. (______**hours**).

Mary took her lunch break at 4:30 p.m. (______**hours**). She returned at 5:30 p.m. (_______**hours**). At 8:30 p.m., ______**hours**) Mary's day came to an end. She clocked out. It took her 20 minutes to get home. She arrived at home at 8:50 p.m. (______**hours**).

On Wednesday, Mary will work the third shift. She must report to work at 11:00 p.m. (______**hours**). John will work the second shift. He reports to work at 3:00 p.m. (______**hours**). He intends to be on time. So, he leaves home one hour early. John will leave home at 2:00 p.m. (______**hours**).

ANSWER SHEET

Exercise 2: Military Time Worksheet (Answers in bold print)

Conventional Time			Military Time
AM	12:00	midnight	2400 hours
	12:01	1-minute past midnight	0001 hours
	12:10	10 minutes past midnight	0010 hours
	1:00	1-O'clock in the morning	0100 hours
	2:00	2-O'clock in the morning	0200 hours
	2:30	2:30 in the morning	0230 hours
	3:00	3-O'clock in the morning	0300 hours
	4:00	4-O'clock in the morning	0400 hours
	5:00	5-O'clock in the morning	0500 hours
	6:00	6-O'clock in the morning	0600 hours
	7:00	7-O'clock in the morning	0700 hours
	8:00	**8-O'clock in the morning**	0800 hours
	9:00	9-O'clock in the morning	0900 hours
	10:00	10-O'clock in the morning	1000 hours
	11:00	11-O'clock in the morning	1100 hours
PM	12:00	noon, midday	1200 hours
	12:18	18-minutes past noon	1218 hours
	12:45	45-minutes past 12 noon	1245 hours
	1:00	1-O'clock in the afternoon	1300 hours
	1:05	5-minutes after 1 p.m.	1305 hours
	2:00	2-O'clock in the afternoon	1400 hours
	3:00	**3-O'clock in the afternoon**	1500 hours
	4:00	4-O'clock in the afternoon	1600 hours
	5:00	5-O'clock in the afternoon	1700 hours
	6:00	6-O'clock in the afternoon	1800 hours
	7:00	7-O'clock in the evening	1900 hours
	18:00	8-O'clock in the evening	2000 hours
	9:00	**9-O'clock in the evening**	2100 hours
	10:00	10-O'clock in the evening	2200 hours
	11:00	11-O'clock in the evening	2300 hours
	11:03	3-minutes past 11 at night	2303 hours
	11:22	22-minutes past 11 at night	2322 hours
	11:47	**47 minutes past 11 at night**	2347 hours

Activity 3a. 2400 hours, 0001 hours, 0010 hours, 0100 hours, 0230 hours, 1100 hours.

Activity 3b. 1200 hours, 1210 hours, 1300 hours, 1400 hours, 1617 hours, 2300 hours

Activity 4. First Shift: 0730 hours, 0930 hours, 1100 hours, 1300 hours, 1430 hours. Second Shift: 1530 hours, 1730 hours, 1930 hours, 2100 hours, 2230 hours. Third Shift: 2330 hours, 0130 hours, 0330 hours, 0530 hours, 0630 hours.

Activity 5. 1. 1435 hours 2. started at 0700 hours (7:00 a.m.), finished at 1700 hours (5:00 p.m.). 3. 9:00 a.m., 11:00 a.m., 2:00 p.m., 6:00 p.m. 7:00 p.m.,9:00 p.m.

Activity 6. Flash Cards. See answers on back of flash cards.

Activity 7. 0500 hours, 0530 hours, 0600 hours, 0700 hours, 1300 hours, 1430 hours, 1445 hours, 1630 hours, 1730 hours, 2030 hours, 2050 hours, 2300 hours, 1500 hours, and 1400 hours.

Graph Comprehension

To the Facilitator:

The curriculum is color coded to indicate levels of difficulty. Yellow represents Minimum Level, blue represents Moderate Level, and Pink represents Maximum Level.

These levels correlate to the benchmarks established by employees and the results of the assessment process validated for selected jobs at the Nabisco Richmond Facility.

YELLOW

Graph Comprehension

Activity 1 - Understanding the Purpose and Use of Graphs

Objective (s): Participants will be able to

1. Become familiar with the purpose of graphs
2. Become familiar with the different types of graphs

Material Needed: Pencil

You Need to Know:

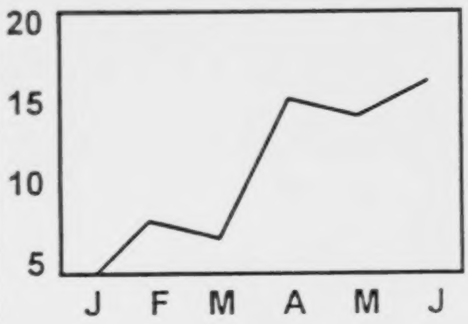
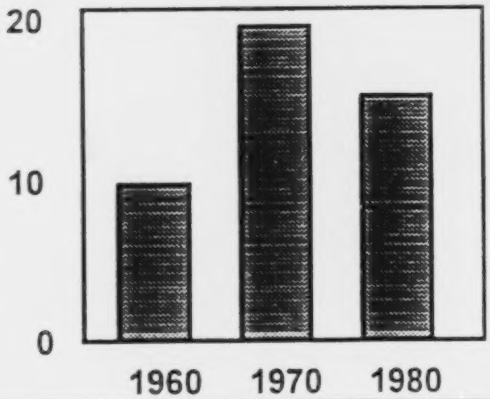
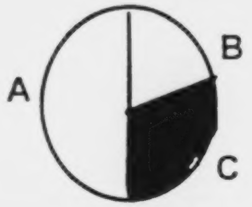
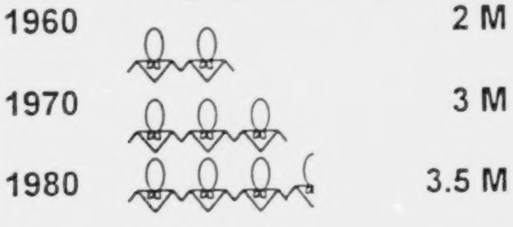
As we go about our everyday activities, we find it necessary to read charts, tables, and other graphic displays to gain information. For example, at the grocery store, we read nutrition facts tables on the back of cereal boxes. Likewise, at the Nabisco Facility employees read control charts, time charts, dials, gauges, thermometers and etc.

Photographs, drawings, cartoons, graphs, charts, diagrams, tables, and maps appear in all kinds of materials today. All of the visual aids mentioned above help us to understand and receive information. Graphs are used to show how number values relate. They are used in business reports, magazines, and even on television during the weather report. **Therefore, graphs are visual representations of information that show comparisons and relationships**.

The purpose of graphs is to clarify concepts that are presented about numerical data. Most people can understand information better when it is presented graphically. Modern textbooks and employee training manuals include graphic displays. Written text often appears to be more interesting to read when graphics are included.

Directions:
Turn to the next page. Read about the different types of graphs and their purpose.

Activity 1 - Understanding the Purpose of Graphs

Types of Graphs	Description & Purpose
Line  	Shows precise relationship between two sets of data. Each point (data point or dot) on the line graph represents the two items in relation to each other. This is the most accurate type of graph. It shows how a trend may be taking place. For example, the fluctuation of bag weights of Oreo cookies over a period of time.
Bar  	A bar graph allows you to show comparisons of values taken at different times or representing different age groups, sexes, product attributes, etc. The bars may be vertical (up and down) or horizontal (side to side). The bars may also be subdivided into parts of a whole or into percentages.
Pie (Circle)  	A pie graph is most commonly known as a circle graph or pie chart. It shows how various parts relate to a whole (100%) and shows percentages. One part of the circle graph is called a slice.
Pictograph (Pictogram)  	Often called a picture graph, a pictogram is the easiest to read, but is difficult to draw. It shows approximate comparisons as bar graphs do, but uses representational figures such as cars, people, or other items being compared.

Activity 2 - Identifying different types of Graphs

Objective(s): Participants will be able to

1. Identify different types of graphs

Materials Needed: Pencil

You Need to Know:

There are many types of graphs used in manufacturing industry. The majority of graphs fall into one of four types: line, bar, pie (circle) or pictograph. Each type of graph has certain advantages. For example, a circle graph is used to show how various items are part of a whole (percentage of 100%). However, a line graph is used to show a trend of the price of sugar. The type of graph used to display information depends on the type and quantity of data that is being presented.

Directions: In the previous activity you learned about four kinds of graphs. First, think of where you may have seen a particular type of graph in the bakery. Then think of where else you may have seen such a graph. Fill in the blank with the department or location.

I have seen examples of line graphs in the______________department.
I have seen examples of line graphs __________________________.

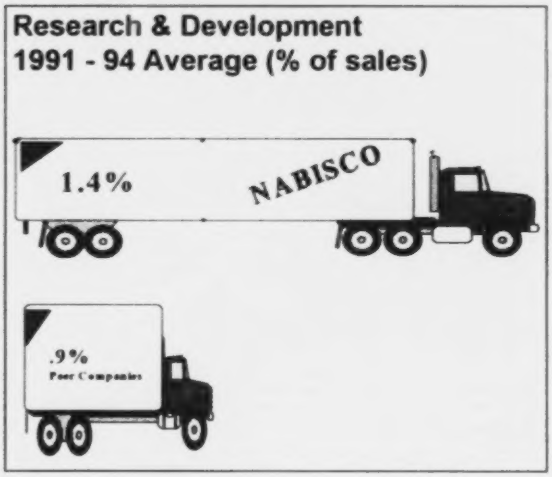
I have seen examples of bar graphs in the _______________department.
I have seen examples of bar graphs __________________________.

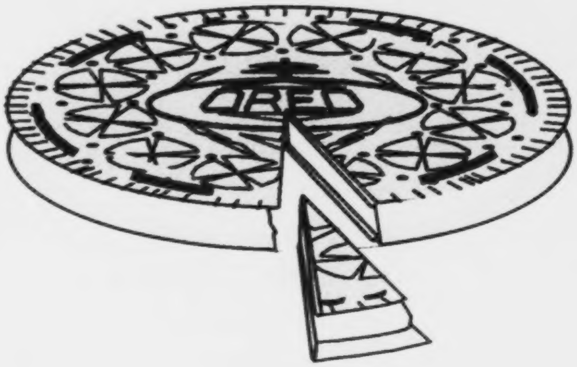
I have seen examples of pie charts in the_________________department.
I have seen examples of pie charts _________________________.

I have seen examples of pictographs in the________________department.
I have seen examples of pictographs ________________________.

Activity 2 - Identifying different types of Graphs, Continued

Directions:
Review the different types of graphs or visual displays below and on the following pages. In the blank spaces provided, identify the type of graph. If you need help, refer back to the first activity.


Research & Development
1991 - 94 Average (% of sales)


Rate of OREO Production (In LBS.)

180,633 lbs. per day

127 lbs. per minute

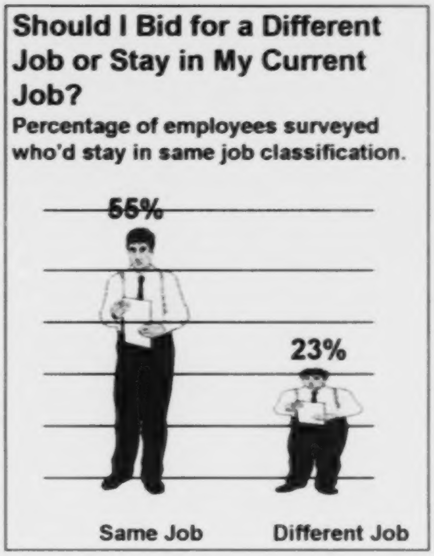
A. ______________________

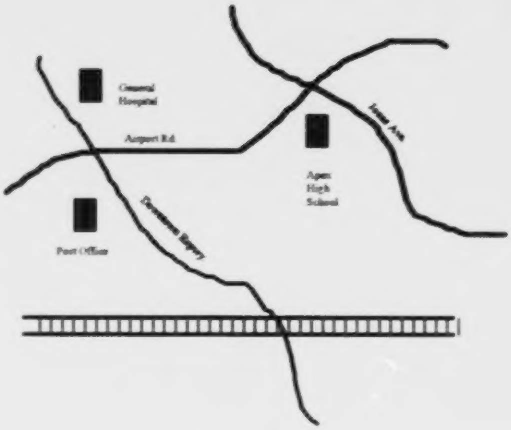
B. ______________________

	PHONE COSTS - ☎ = $10,000
1994	☎ ☎ ☎ ☎ ☎ ☎ ☎
1993	☎ ☎ ☎ ☎ ☎
1992	☎ ☎ ☎ ☎
1991	☎ ☎ ☎ ☎

C. ______________________

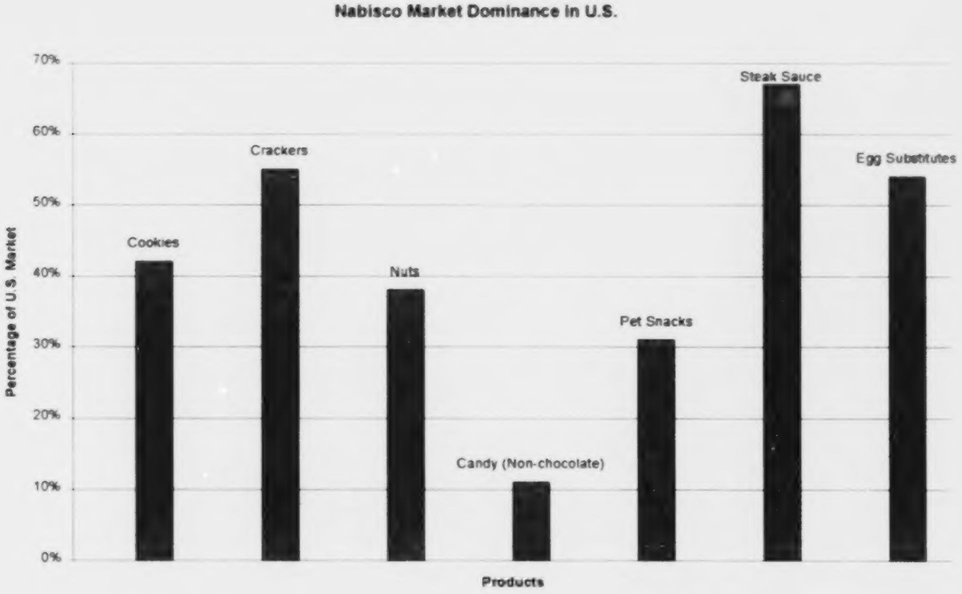
BEST COPY AVAILABLE


Should I Bid for a Different Job or Stay in My Current Job?
Percentage of employees surveyed who'd stay in same job classification.
55%
23%
Same Job
Different Job

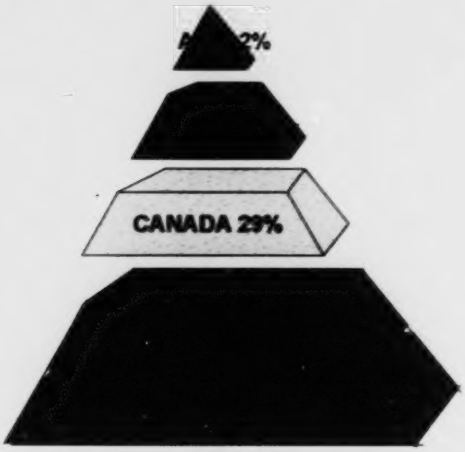

General Hospital
Airport Rd
Apex High School
Post Office

E. ______________________________

D. ______________________


Nabisco Market Dominance in U.S.
70%
60%
50%
40%
30%
20%
10%
0%
Percentage of U.S. Market
Cookies
Crackers
Nuts
Candy (Non-chocolate)
Pet Snacks
Steak Sauce
Egg Substitutes
Products

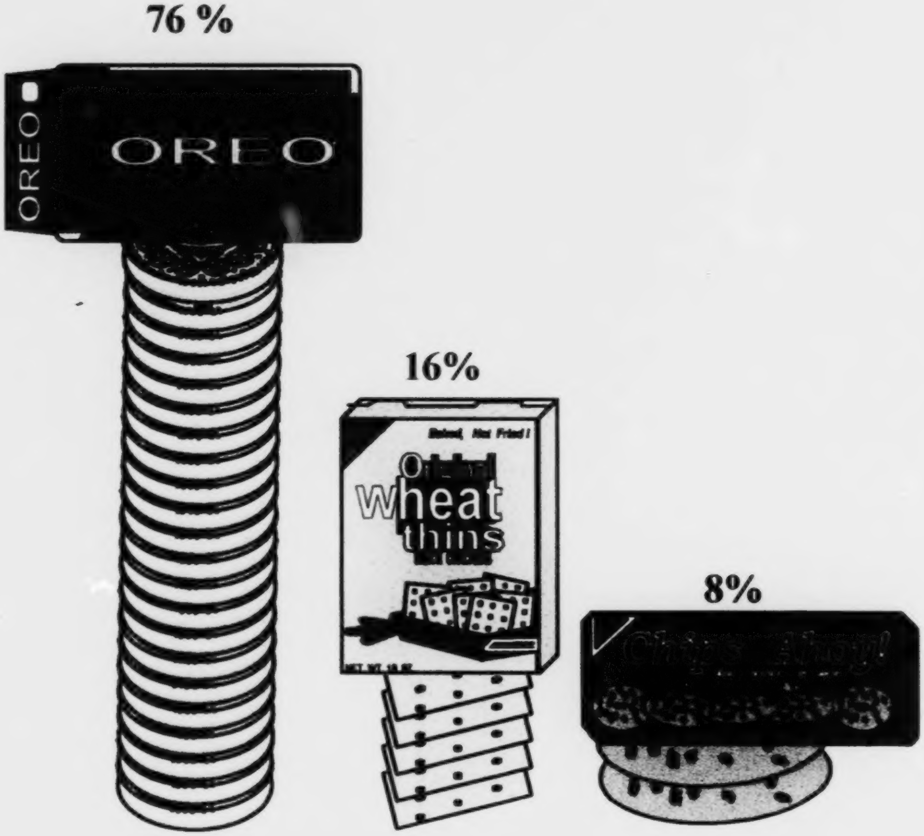
F. ____________________________________



NABISCO INTERNATIONAL SALES

G. ______________________________

A group of 25 Richmond, VA third graders compared their favorite Nabisco products. Their data are graphed below.



H. ____________________

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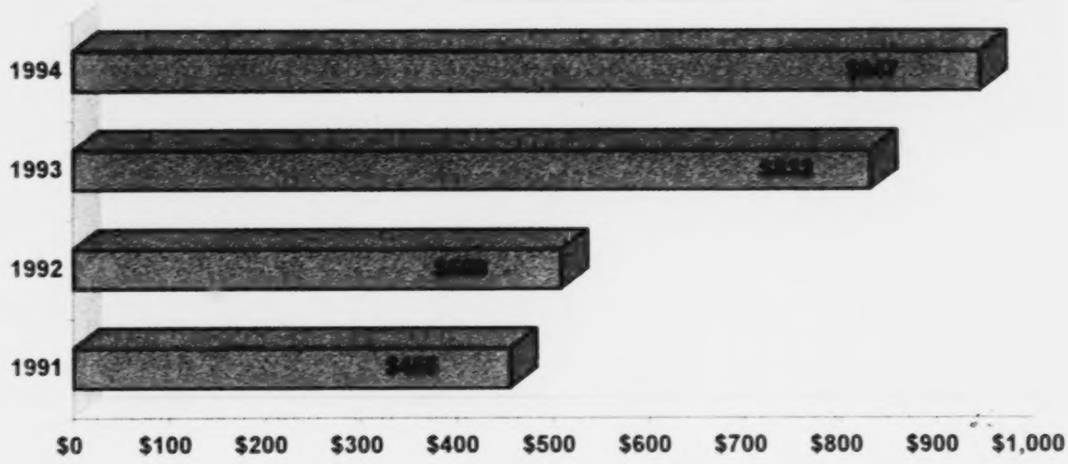
Nabisco New Product Sales in the U.S.
(in millions)



I. ____________________

Activity 3 - Learning to Read Graphs

Objective(s): Participants will be able to

1. Become familiar with general tips for reading graphs

Materials Needed: Pencil

You Need to Know:

Tips for reading graphs

1. Notice the title and type of graph you're reading. The title will tell you the purpose and main idea.

2. Notice the arrangement of the data (numerical values). Read the vertical and horizontal column headings to get an understanding of what is being compared. For example, a graph may compare the amount of salt used in the Ritz cracker with the Sociables.

3. Notice the scale. What are the increments (number of spaces) of increase or decrease? Be aware of any fluctuation of the data. Look at the pattern of the data points.

4. Read the key (same as legend). It tells you the meaning of the symbols. Color coding and surface patterns are important. For example, look at heavy shading, dots, crossed lines etc.

5. Notice the symbols being used. This is particularly important with pictographs. Some symbols are decorative or may be very meaningful. That's why it is so important to check the key.

6. Read any text around the graph. Relate the graph to any written text. Do some critical thinking. Draw conclusions based on the data presented only. Ask yourself, what comparisons are being made?

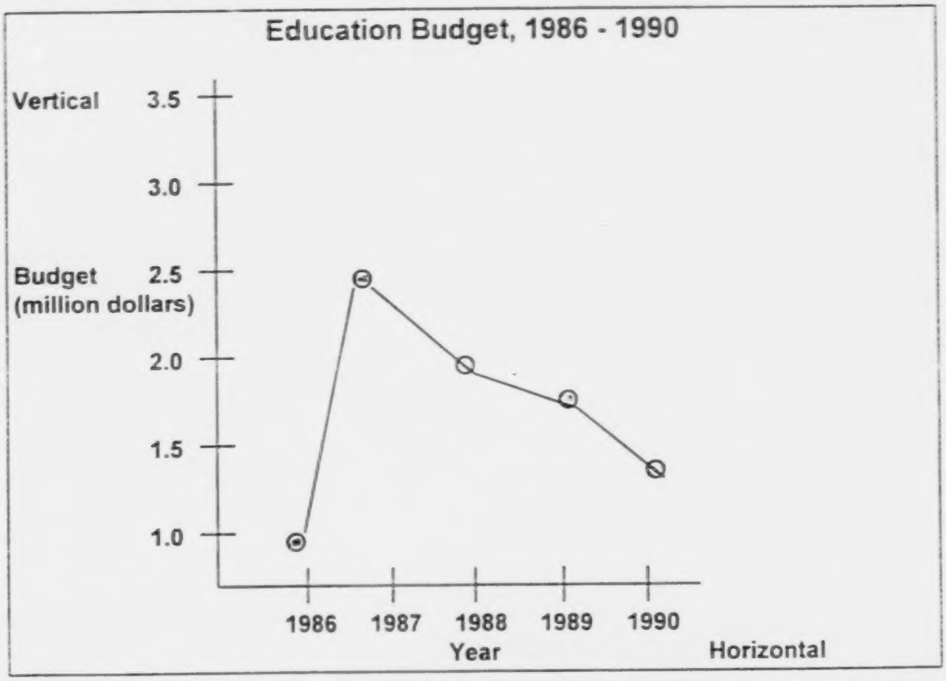
Activity 4 - Reading and Understanding Line Graphs

Objective(s): Participants will be able to

1. Read graphs using tips identified in the previous activity.
2. Practice reading line graphs.

You Need to Know:

Line graphs are easy to read. They present precise values. Line graphs have reference lines called axis. **The horizontal (side to side) line is called the x-axis. The vertical (up and down) line is called the y-axis.** Look at the graph below.



The horizontal axis that goes from left to right usually shows the units of time. The units may be hours or days, months, etc. Each mark on the scale stands for one unit of time. The vertical axis (up and down) shows the amount that is being measured. The amount may be dollars, pounds, or another kind of unit. Each mark stands for one unit.

The graph shows education budget for the years 1986 through 1990. Look at the horizontal axis (x-axis). What unit does each mark represent?

____

Each mark on the time axis represent one year. Each mark on the dollar axis represent a certain money amount: one-tenth of $1 million ($100,000).

To read the amount, you read the mark on the dollar axis that's directly across from the point. Then you read the mark on the time axis that is directly beneath the point.

Look at the point that is farthest to the left. What amount does it represent?

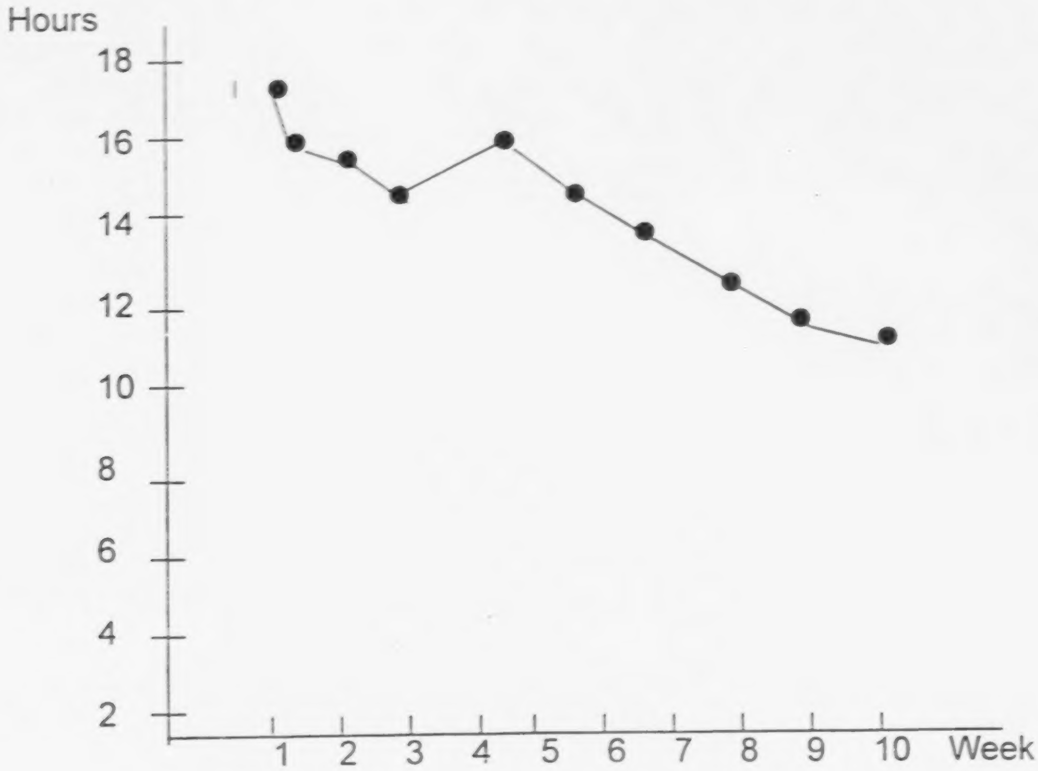
____

You would read the amount as $1.0 million in 1986.

Activity 4 - Understanding and Reading Line Graphs

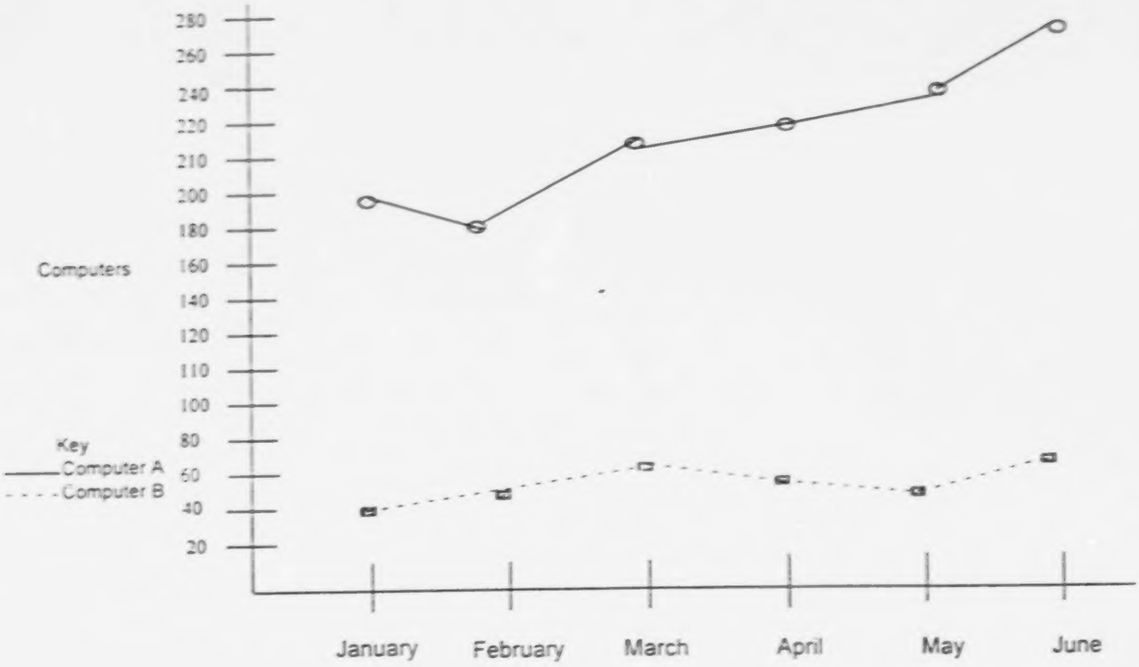
Line graphs can also be used to show how something has changed over a period of time. Data points (dots) are used to represent trends or relationships. Look at the example of the amount of down time recorded each week because of computer failure.

Computer Failure - Down Time



Sometimes a graph is used to show two or more different trends. These line graphs allow you to compare the changes in the trends during the same time period. A computer store may want to see how many of the two different brands of computers sold from January to June. Turn to the example on the next page.

Sales of Computers A and B, January - June



Look at the line graph. How do you know which line stands for computer A?______________________.

The tips you learned in previous activities helped you understand that you should always notice the key (legend). Sometimes, a line may be identified by a label (word). Now identify the two lines above by writing ***Computer A*** or ***Computer B*** beside the right line on the graph.

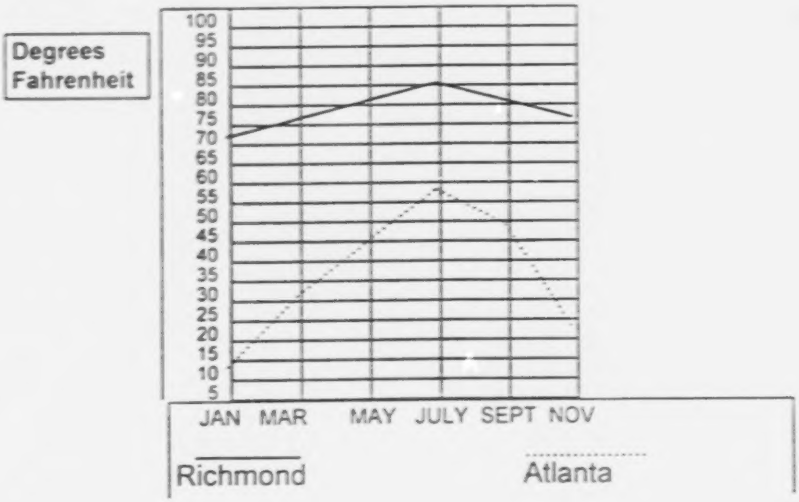
Activity 5 - Reading and Understanding Line Graphs

Objective(s): Participants will be able to

1. Read graphs using the tips identified in the previous activity.
2. Practice reading line graphs.

Directions:
Nabisco's bake shop employees are usually concerned about the weather because temperatures affect the baking process. Read the graph, and answer the questions.

Monthly Normal Temperatures



1. Which line represents Richmond?______________

2. How were you able to determine which line represented Richmond?______________________________

Activity 5 - Reading and Understanding Line Graphs, Continued

3. Which city, Richmond or Atlanta, has the greatest range of temperatures during the year?__________________

4. During which month is there the least amount of difference between the temperatures of the two cities?_________________

5. During January, how much warmer is Richmond's average temperature than Atlanta? _______________

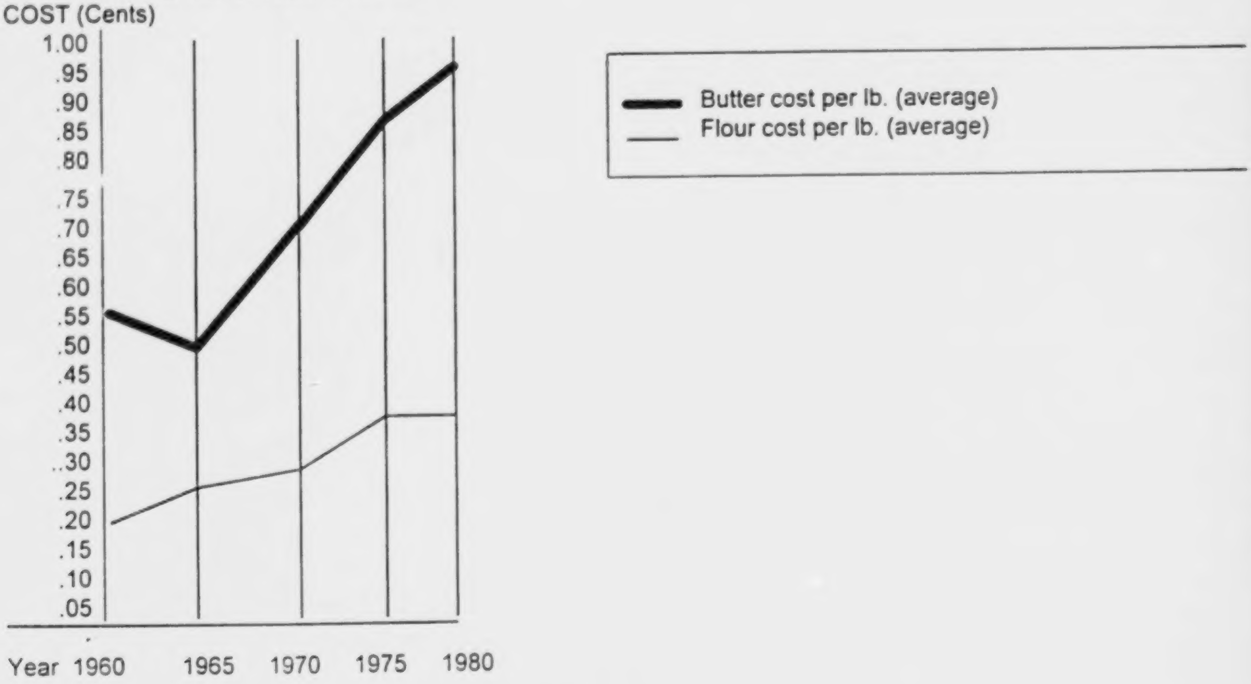
6. What relationship or comparison is being made here? *(Write your answer using a complete sentence.)* ____________________________

____

____

Directions: Read the line graph below. Answer the questions.

Price Trends for Butter and Flour



1. How much did a pound of flour cost in 1960?_______________

Activity 5 - Reading and Understanding Line Graphs, Continued

3. How much did a pound of butter cost in 1960?___________

4. Between which two years did the price of butter fall?
____

5. How much more did a pound of flour cost in 1980 than in 1960?
____

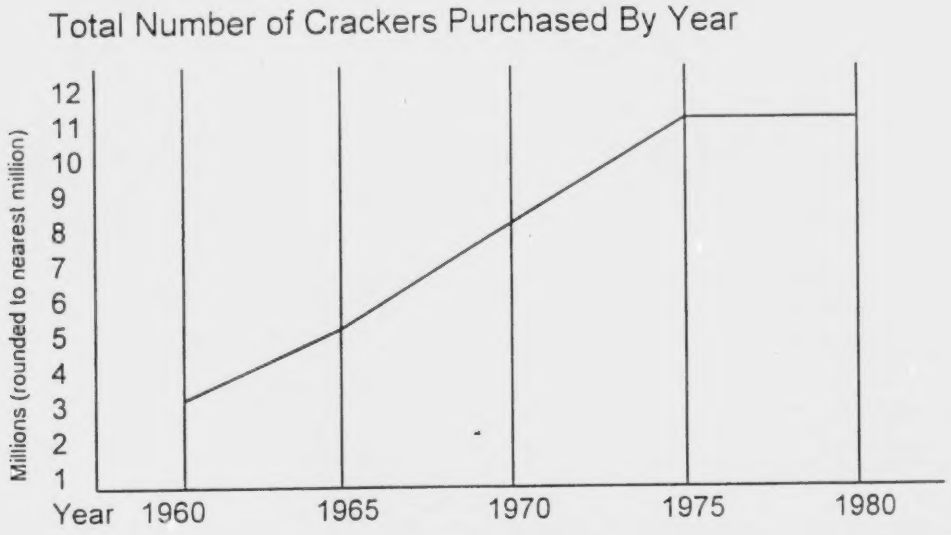
6. In 1980, how much more did a pound of butter cost than a pound of flour?___________________________

Activity 6 - Reading and Understanding Line Graphs

Objective(s): Participants will be able to

1. Practice reading line graphs.

Directions:
Read the line graphs below. Answer the questions.



1, Does the graph show exact numbers or approximate numbers?

____

2. About how many crackers were purchased in 1970?

____

3. Between which years did the number of purchases level off?

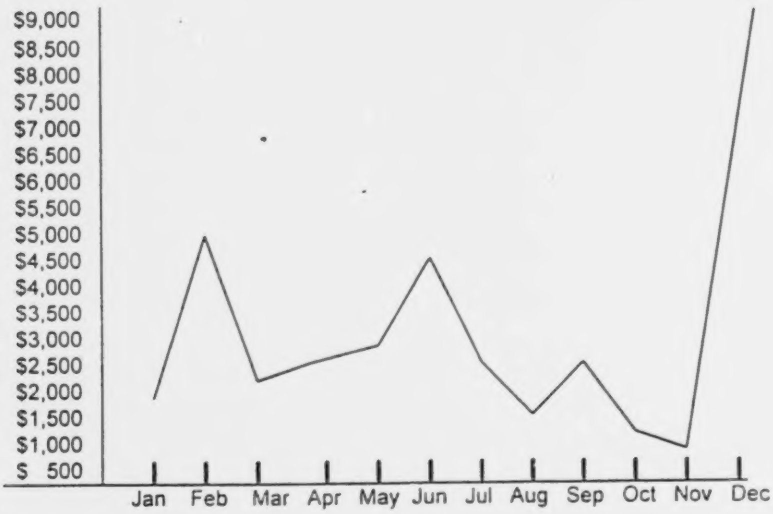
____

4. About how many more purchases were made in 1970 than in 1960?

____

Activity 6 - Reading and Understanding Line Graphs, Continued

1990 Monthly Sales of Animal Cookies



1. What is the subject of the line graph (write a complete sentence)?
____

2. What is the main point?______________________________

3. In what month did the store make the fewest sales?___________

4. In what month did the store make the greatest sales?___________

5. What interesting conclusion can you draw about the great rise in animal cookies sales in December?______________________
____

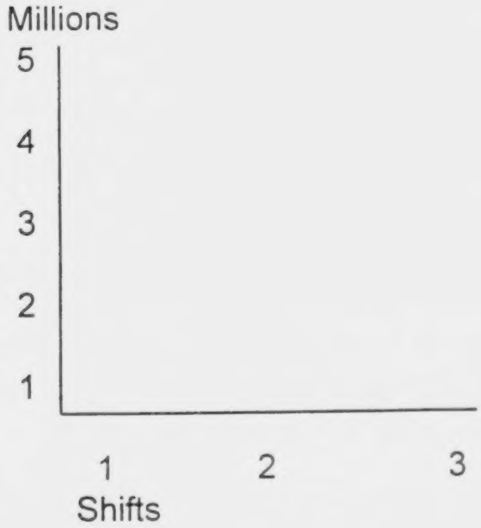
Activity 7 - Understanding Line Graphs in the Workplace

Objective(s): Participants will be able to

1. Read graphs using tips identified in the previous activity.
2. Practice reading line graphs.

Directions:
Read the line graph below. Answer the questions.

Premium Crackers Produced Per Shift



1. What is the unit of the y-axis?______________________________

2. Plot the data points for each shift. The first one has been done for you (*Shift 1* - 1.0 million). *Shift 2* - 2.5 million; *Shift 3* - 4 million Now draw a line connecting the data points.

2. At what point were the fewest crackers produced?

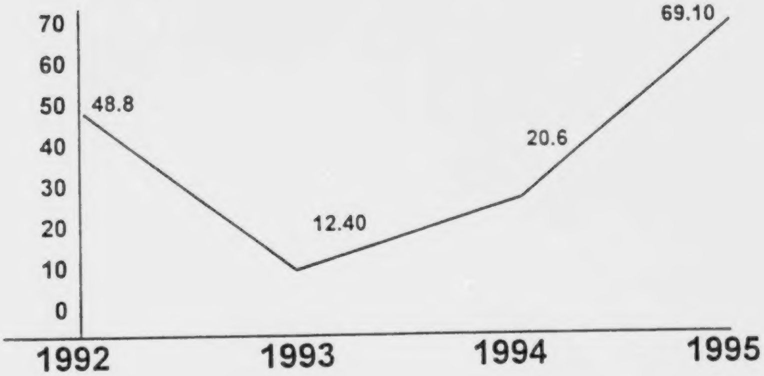
   ____

3. What conclusion can be drawn from the graph about the production of crackers?______________________________.

Activity - 7 Understanding Line Graphs in the Workplace, Continued

Directions: The line graph below depicts the severity of accidents that have occured at a factory from June '92 through June '95. Read the line graph below. Answer the questions.

SEVERITY RATE
JUNE '92 - JUNE '95



1. Based on the data how would you summarize the accident severity rate over the time period indicated?______________________________

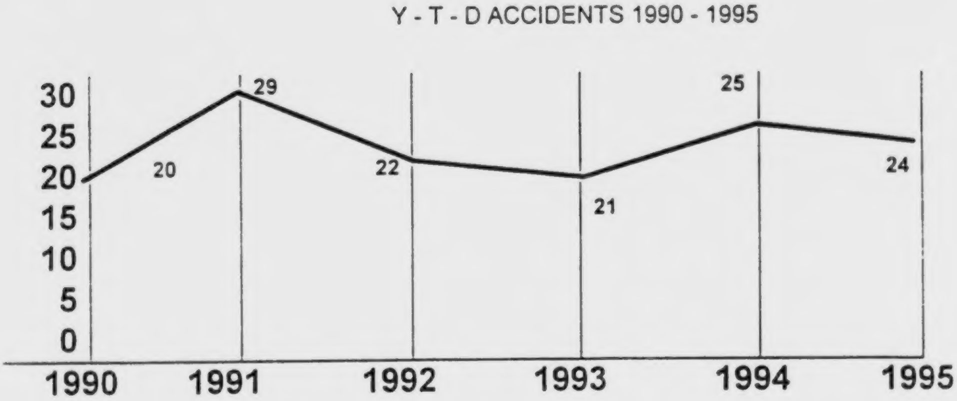
2. This line graph depicts the accident severity rate over what time period?____
____

3. Compare the serverity rate of 1992 to 1995. Is it increasing or decreasing?________________

4. What is the difference in the severity rate for 1995 and 1993?
____

Activity - 7 Understanding Line Graphs in the Workplace, Continued

Directions: The line graph below depicts the number of accidents that have occured at a company from 1990 and 1995. Read the line graph below. Answer the questions.



1. In what year was the highest number of accidents recorded?

   ____

2. In what year was the lowest number of accidents recorded?

   ____

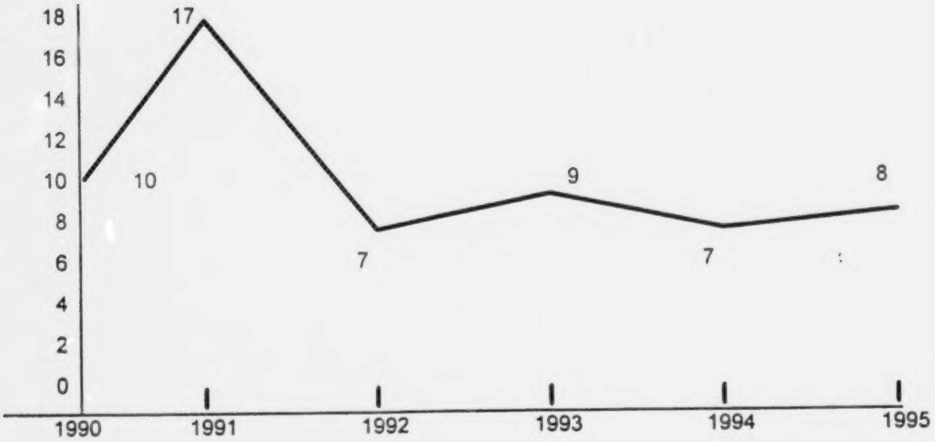
3. Between which years did the accident rate seem to almost level off?________________________

4. What is the difference in number of accidents between 1992 and 1993, and 1994 and 1995? ____________________________

Activity - 7 Understanding Line Graphs in the Workplace, Continued

Directions: The line graph below depicts the amount of time lost due to accidents at a factory from 1990 and 1995. Read the line graph below. Answer the questions.

LOST TIME ACCIDENTS
Y - T - D 1990 - 1995



1. What year was recorded as having the largest amount of time lost due to accidents?_______________________

2. What years were recorded as having the smallest amount of time lost due to accidents?

____

3. What conclusion can be drawn regarding the amount of lost time in 1991 and 1994?___________________________________
____

Activity - 8 Creating a Line Graph

Objective(s): Participants will be able to

1. Practice creating a line graph.

Materials Needed: Pencil, graph paper

Directions:
Use graph paper to create a line graph. Study the data presented below to determine what should be represented. Give the graph a title. You may refer back to the graphs in the previous activities.

Number of Oreos produced per day
1 million
1.5 million
2 million
2.5 million
3 million
3.5 million
4 million

5 days of production
Monday through Friday

Activity 9 - Reading and Understanding Bar Graphs

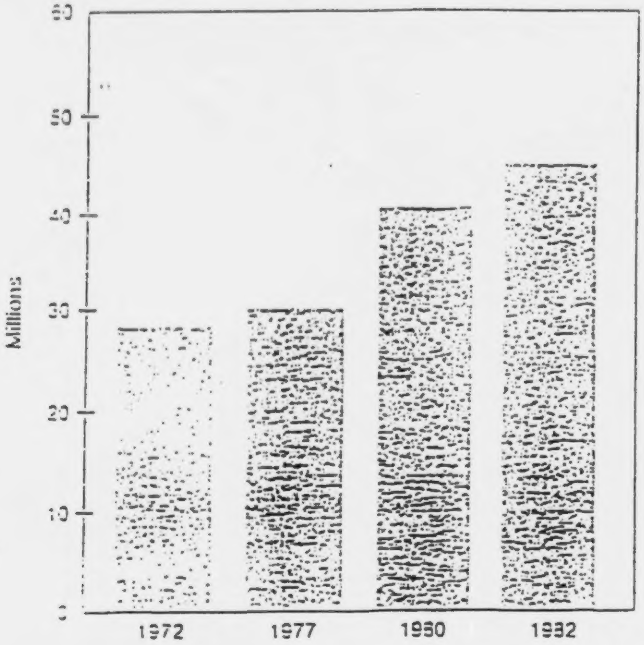
Objective(s): Participants will be able to

1. Practice reading bar graphs.

You Need to Know:
The same tips you used to read line graphs can be applied when reading bar graphs. If you need to review the tips, refer back to activities three and four.

Directions: Read the bar graph below. Answer the questions.

Employee Recreational Activities Attendance



1. This graph provides information for how many years?___________

2. Is the participation in recreational activities increasing or decreasing?___________

3 About how many more people participated in recreational activities in 1980 than in 1977?______

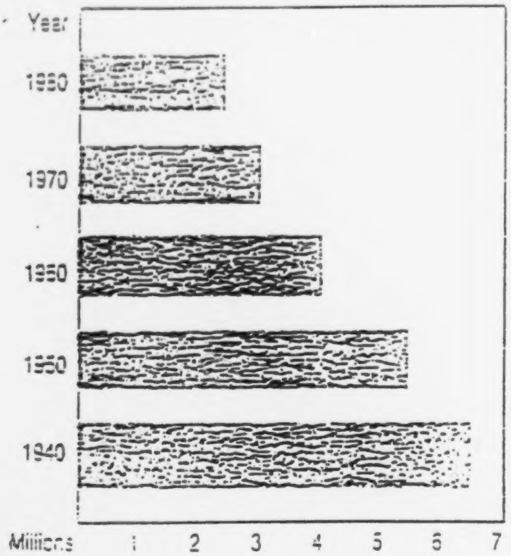
Activity 10 - Reading and Understanding Bar Graphs

Objective(s): Participants will be able to

1. Practice reading bar graphs.

Directions: Read the bar graph below. Answer the questions.

Number of Manufacturing Plants in the United States



1. Is this a vertical or horizontal bar graph?________

2. About how many plants were there in the United States in 1960?

    ____

3. About how many more plants were there in 1940 than in 1980?

    ____

4. Based on the trend shown in the chart, would you expect there to be more or fewer plants by the year 1985? ________

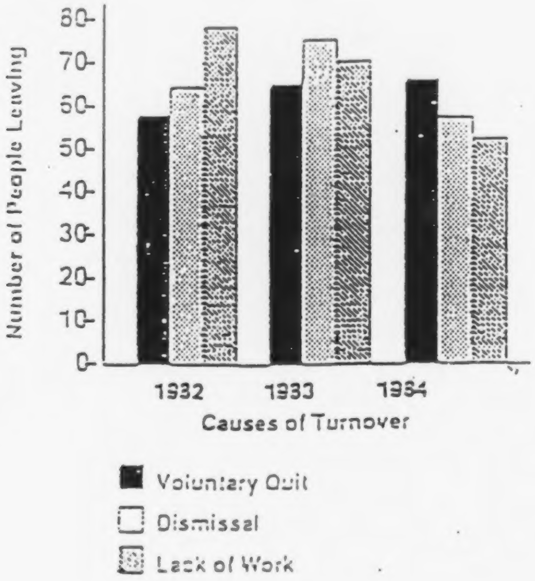
Activity 11 - Reading and Understanding Bar Graphs

Objective(s): Participants will be able to

1. Practice reading bar graphs.

Directions: Read the bar graph below. Answer the questions pertaining to it below. Circle true or false or write the answer in the blank.

Causes of Turnover at Company XYZ



1. Based on the data shown, in 1984 were there more dismissals than voluntary quits? T F

2. There were more dismissals in 1983 than in any other year? T F

3. Which year represented the least about of voluntary quits?________

4 What are the increments of increase on the y-axis?____________

5 What does the y-axis data represent?_________

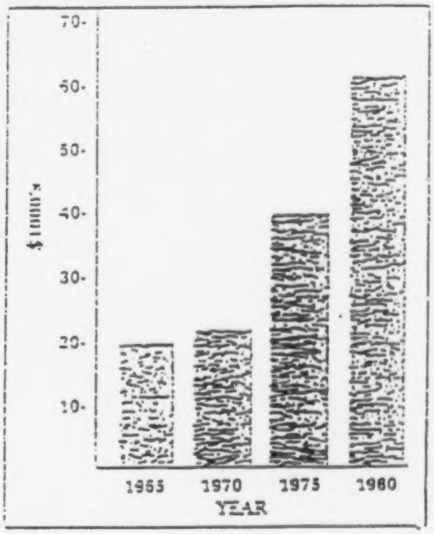
Activity 12 - Reading and Understanding Bar Graphs

Objective(s): Participants will be able to

1. Practice reading bar graphs.

Directions: Read the bar graph below. Answer the questions pertaining to it below.

Average Price of Roller Belts



1. Does this graph show exact numbers or approximate numbers?__________

2. What was the average price of a roller belt in 1965?

____

3. Between which years shown on the graph did the price of a the roller belt increase the least amount?___________

4. About how much more did a roller belt cost in 1980 than in 1970?

____

5. Based on the graph, would you expect the price of roller belts to rise in the future?________________________

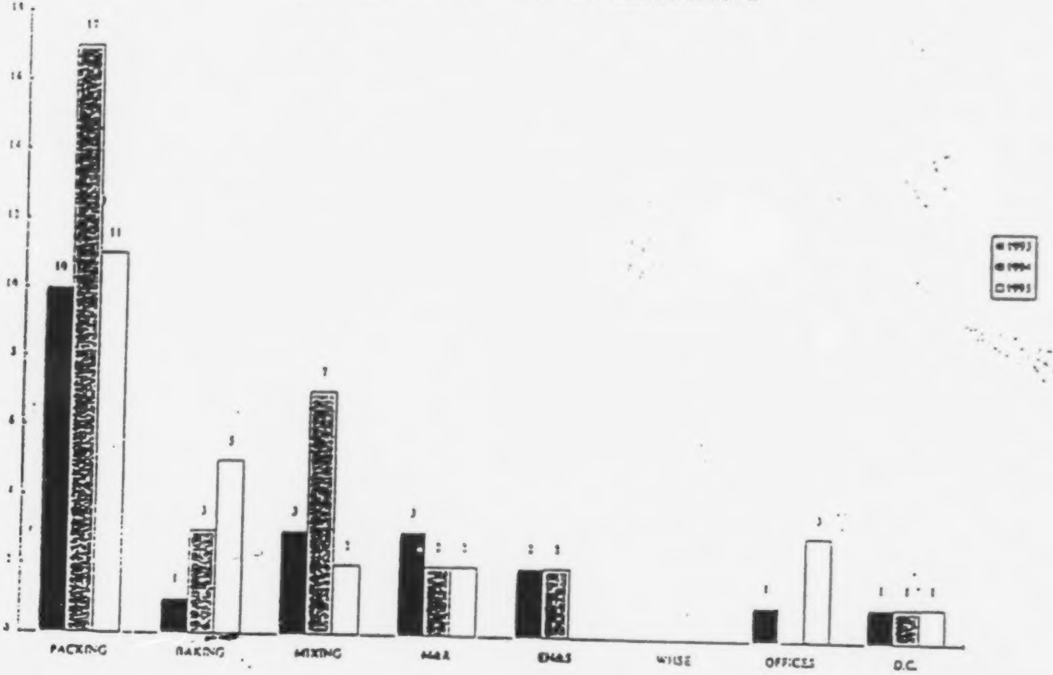
Activity 13 - Reading and Understanding Bar Graphs in the Workplace

Objective(s): Participants will be able to

1. Practice reading bar graphs.

Directions: Read the bar graph. Answer the questions.

ACCIDENTS BY DEPARTMENT



1. Which department had the lowest number of accidents in 1993?_____________

2. Which department had the lowest number of accidents in 1994?__________

3 Which department recorded the most accidents over the three year period?___________

Activity 14 - Creating a Bar Graph

Objective(s): Participants will be able to

1. Practice creating a bar graph.

Materials Needed: Pencil, graph paper

You Need to Know:

Before attempting to create a bar graph, study the problem or question to determine what information is given for the values.

Determine the type of units should be shown on the x-axis. Do the same for the y-axis. If you need help, turn back to previous activities.

Directions:

Use graph paper to create a bar graph. Study the data presented below to determine what should be represented. Give the graph a title.

Number of students attending REACH from M&R, Packing, Mixing

Department	*Number of Students*
M&R	5
Packing	15
Mixing	3

Activity 15 - Reading and Understanding Pie Graphs (Charts)

Objective(s): Participants will be able to

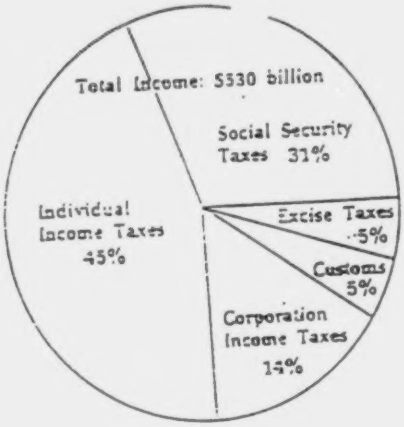
1. Practice reading pie graphs.

You Need to Know

Circle graphs show an entire quantity divided into various parts. Each part of the circle is called a segment or slice. Each segment has its own name and value. In most cases, values of circles graphs are parts of a dollar or percent of a whole (100%). They are usually used to show budget percentages. For example, the sources of each dollar that in the federal government budget.

Directions: Read the pie charts below. Answer the questions.

Government Spending



1. What is being presented in this graphic?____________________

2. The federal government received about 76% of its money from two sources. What are the two sources?______________________
____

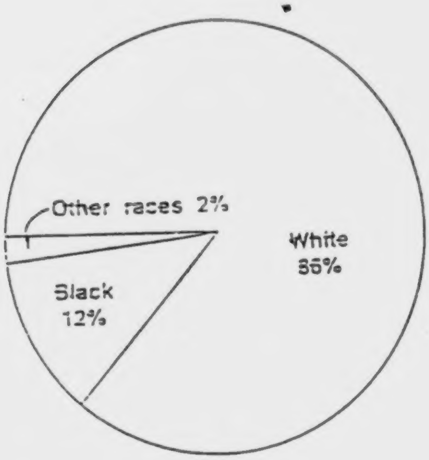
3. What percent of the government's income came from customs and excise taxes combined? ____________________

Activity 15 - Reading and Understanding Pie Graphs (Charts), Continued

4. About how much money did the government's receive from customs and excise taxes combined?________________

5. What is being compared or the relationships of the numbers in this graphic?_______________________________________

Population of Maine
Total Population: 6 Million



1. What is the total population of Maine?__________

2. What percent of Maine's population is white?_______

3. What percent of non-whites live in Maine? ________

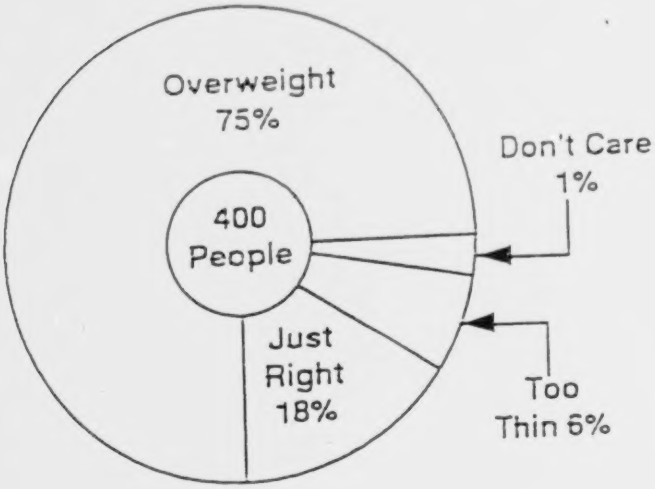
Activity 16 - Reading and Understanding Pie Graphs

Objective(s): Participants will be able to

1. Practice reading pie graphs.

Directions: Read the pie chart below. Answer the questions.

Survey of Feelings About Weight



1. How many categories of feelings are presented in the chart?_____

2. What percentage of people felt they were overweight?__________

3. What is the total number of people who participated in the survey?

____

4. More people felt they were "just the right size" than the overweight?
(circle one) T or F

5 What percentage of people "didn't care" about the weight question?

____

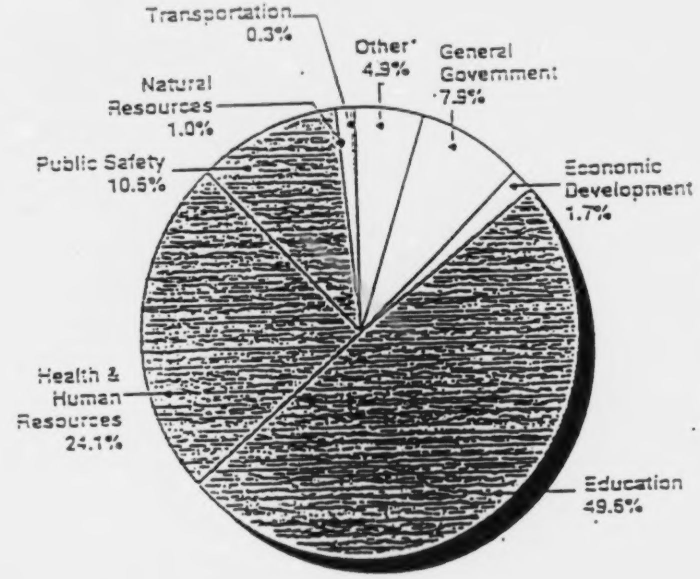
Activity 17 - Reading and Understanding Pie Graphs

Objective(s): Participants will be able to

1. Practice reading pie graphs.

Directions:
Read the pie chart below. Answer the questions.

Montana's General Fund Budget 1992



1. Most of the budget came from what three areas?
____________________, ____________________,
____

2. What is the combined percentage of the budget directed to Transportation and Natural Resources? _______________

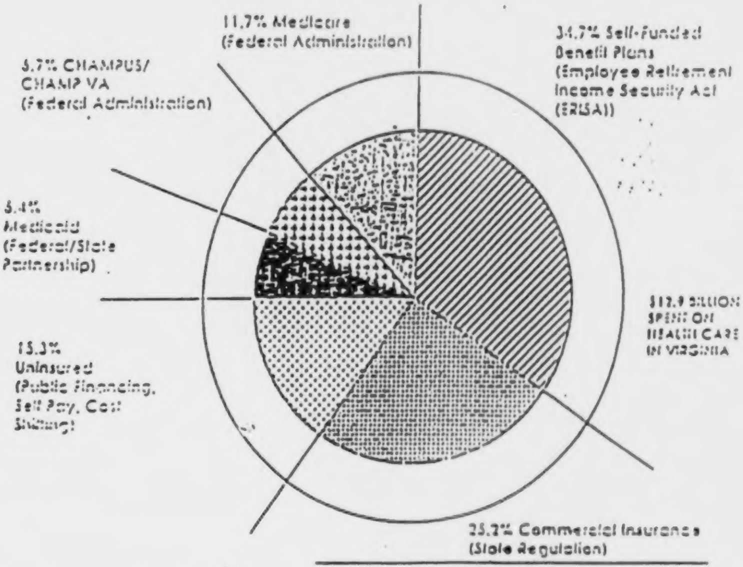
3. What slice of the pie presents the lowest percentage of the budget?
____

Activity 18 - Understanding Pie Graphs

Objective(s): Participants will be able to

1. Practice reading pie graphs.

Directions:
Read the pie chart below. Answer the questions.



HEALTH INSURANCE STATUS
OF VIRGINIA'S POPULATION

1. How many Virginians were uninsured?____________

2. How many Virginians receive Medicare?____________

3. The majority of Virginians participate in self-funded benefit plans?
T or F

4. What is the combined percentage of Virginians that participate in Champus, Medicaid, and Medicare plans?_______

Activity 19 - Creating a Pie Graph

Objective(s): Participants will be able to

1. Use numerical data given to create a pie charts.

Materials Needed: Pencil, graph paper

Directions:
Below you will find figures on the number of people who purchased OREO cookies last year and the results of a NILLA's taste survey. Create pie charts using the figures. Use graph paper and don't forget to give the charts a title and label all slices.

Chart # 1
1977 Oreo Purchasers
25% people in age range of 20-25
45% in age range of 30-35
20% between ages of 40-45
10% Unknown

Chart #2
Nilla Wafers, Taste Survey
78% - Liked the taste with peanut butter
20% - Didn't like the taste with peanut butter
2% - No preference

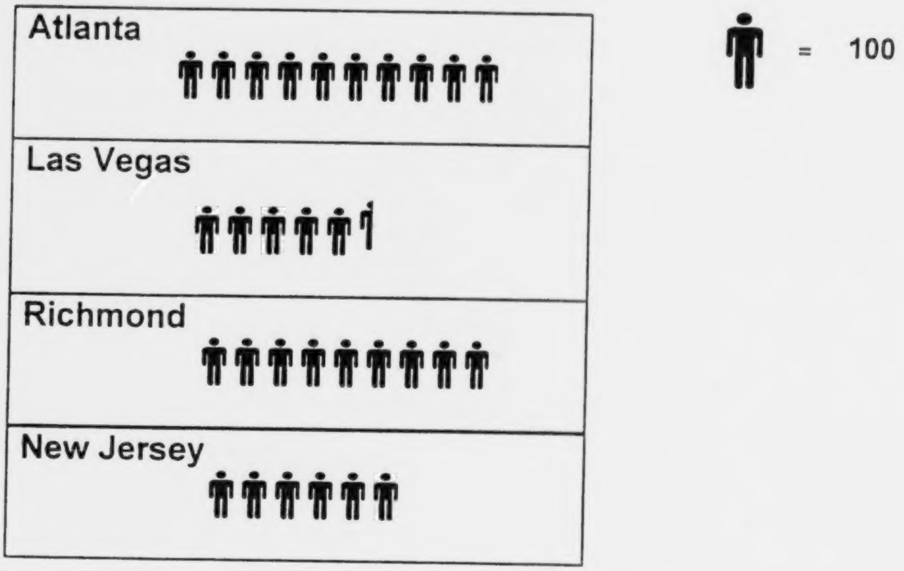
Activity 20 - Reading and Understanding a Pictograph

Objective(s): Participants will be able to

1. Practice reading a pictograph.

Directions: Read the pictograph below. Answer the questions.

Nabisco Facility Employee Population



1. What is being compared in this graphic?____________________
2. What type of graphic is represented?____________________
3. According to the graph, about how many people are employed by the Las Vegas facility?____
4. About how many people are employed by the New Jersey facility?____________________
5. How many people are employed by the Las Vegas, Richmond, and the Atlanta facilities combined? ________________

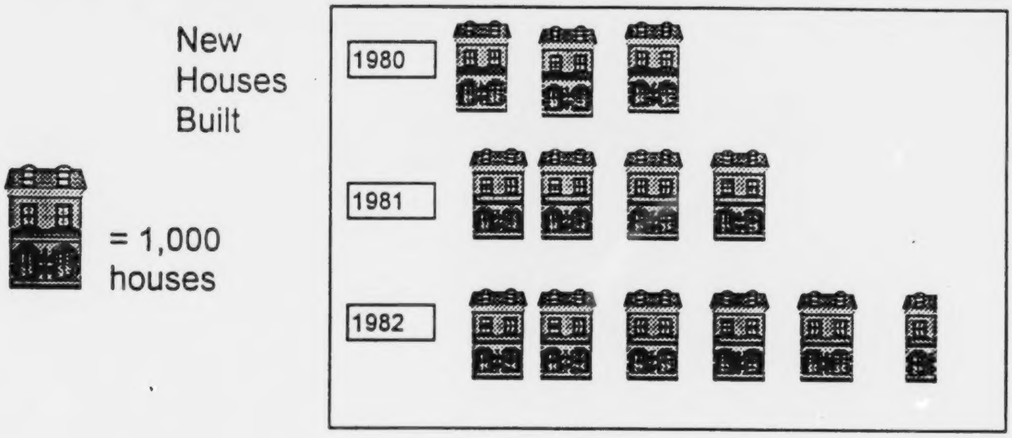
Activity 21 - Reading and Understanding a Pictograph

Objective(s): Participants will be able to

1. Practice reading a pictograph.

Directions: Read the pictograph. Answer the questions.

New Homes Built in James City



1. What is the value of one house on the graph?________

2. In 1980, about how many houses were built in James City?
____

3. Find the total number of houses built in James City for the years 1980, 1981, and 1982?

Activity 21 - Reading and Understanding a Pictograph, Continued

Average Yearly Cost of Tuition &
Fees at Public Colleges
$ = $200

1960	**$ $ $ $**
1965	**$ $ $ $ $**
1970	**$ $ $ $ $ $**
1975	**$ $ $ $ $ $ $ $**
1980	**$ $ $ $ $ $ $ $ $ $**

1. What was the average cost of tuition and fees for the year 1965?
   ____

2. Is the cost of tuition and fees increasing or decreasing? ___________

3. How much more did tuition and fees cost in 1980 than in 1960?
   ____

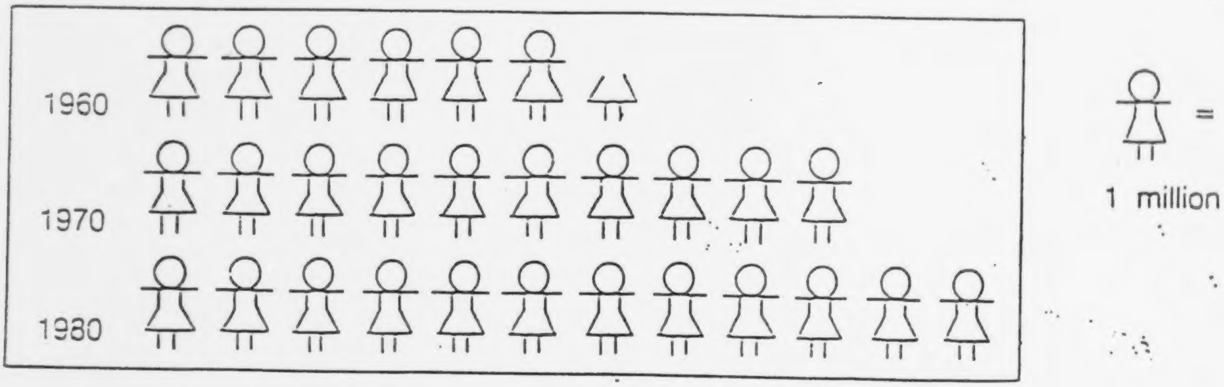
Activity 22 - Reading and Understanding a Pictograph

Objective(s): Participants will be able to

1. Practice reading a pictograph.

Directions: Read the pictograph. Answer the questions.

Working Women in the United States



1. If the trend shown in the graph continues, would you expect there to be more or fewer working women by the year 1985?__________

2. About how many working women were there in 1960?__________

3. About how many more working women were there in 1980 than in 1960?______________

Activity 23 - Creating a Pictograph

Objective(s): Participants will be able to

1. Use numerical data to create a pictograph.

Materials Needed: Pencil, graph paper

You Need to know:
Determine what information needs to be represented. Consider what figure would best represent the information to be presented. Create a key (legend) to help readers understand what the values.

Directions:
Below you will find figures on the number of people who commute to work each day. Create a pictograph using a car as your symbol to represent the following numerical values.

Carpools by Van by Shifts
Shift 1 - 15
Shift 2- 10
Shift 3 - 4

BLUE

Activity 24 - Understanding the Purpose of Charts

Objective (s): Participants will be able to

1. Become familiar with the purpose of charts
2. To identify different types of charts

Materials Needed: Pencil

You Need to Know:

Charts are used to organize information.

Charts are visual summaries of important steps or relationships. They may combine pictorial, symbolic, numeric, and or verbal elements.

Directions: Read the information about charts that follows.

Types of Charts Description & Purpose
Flow Chart Shows simple and complex sequences. Shows a process, organization, or functional relationship.
Tree Shows the way many things developed from one source. Also shows what has developed from the root to many branches.
Time Line Shows relations among events, cause and effect, sequence, multiple lines may be used to show overlapping events.

Comparison

Shows differences and similarities (compare and contrast, pros and cons, advantages and disadvantages. May be verbal or statistical.

Diagram

Shows structure of a system (a schematic), steps in a process. Classifies complex procedures.

Activity 25 - Learning how to read Charts

Objective (s): Participants will be able to

1. Become familiar with general tips used to read charts.
2. Practice using the tips to read charts.

Materials Needed: Pencil

You need to Know:

Here are some tips for reading charts:

1. Notice the title and type of chart. This will give you the main idea and purpose.

2. Notice symbols. Notice details. Observe relationships.

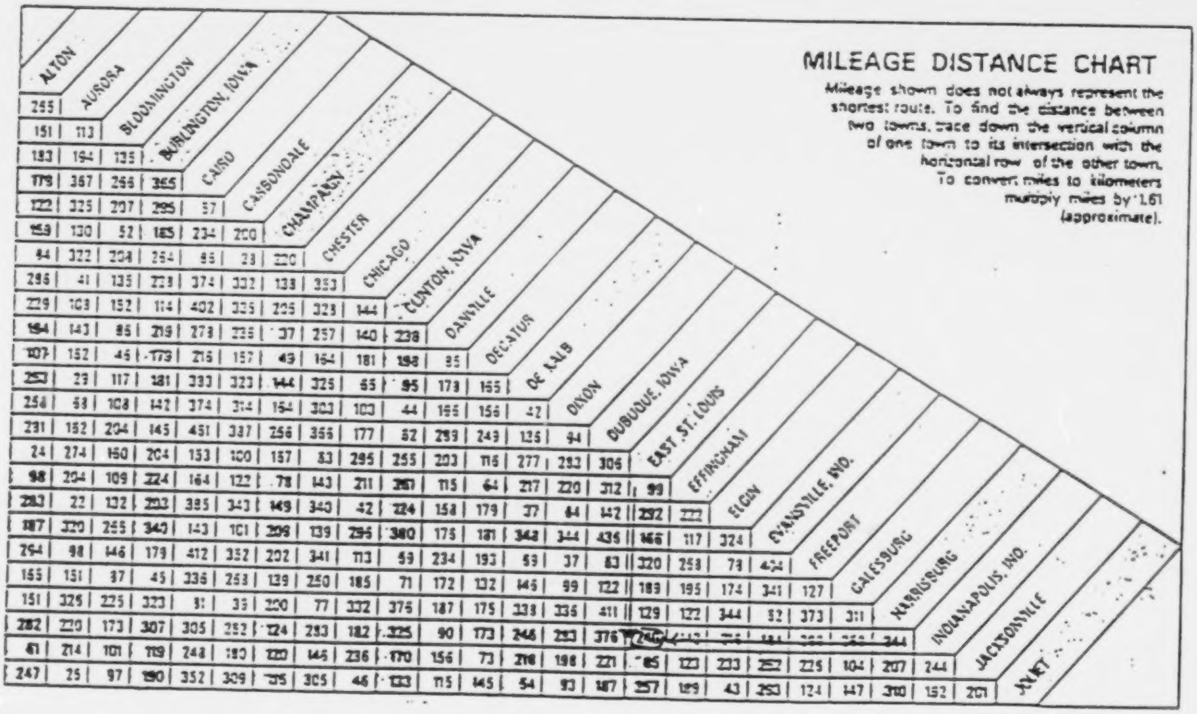
3. Notice the pattern of organization:
    - cause and effect
    - comparison/contrast
    - chronological order
    - classification
    - step-by-step procedure
    - system

4. Think about the data. Draw conclusions based on the data.

5. Read any text that is associated with the chart.

Now, let's look at a mileage chart on the next page.

Activity 25 - Learning How to Read Charts, Continued



MILEAGE DISTANCE CHART

Mileage shown does not always represent the shortest route. To find the distance between two towns, trace down the vertical column of one town to its intersection with the horizontal row of the other town. To convert miles to kilometers multiply miles by 1.61 (approximate).

	ALTON	AURORA	BLOOMINGTON	BURLINGTON, IOWA	CAIRO	CARBONDALE	CHAMPAIGN	CHESTER	CHICAGO	CLINTON, IOWA	DANVILLE	DECATUR	DE KALB	DIXON	DUBUQUE, IOWA	EAST ST. LOUIS	EFFINGHAM	ELGIN	EVANSVILLE, IND.	FREEPORT	GALESBURG	HARRISBURG	INDIANAPOLIS, IND.	JACKSONVILLE
AURORA	255																							
BLOOMINGTON	151	113																						
BURLINGTON, IOWA	183	194	135																					
CAIRO	179	367	256	365																				
CARBONDALE	122	325	207	295	57																			
CHAMPAIGN	159	130	52	165	234	200																		
CHESTER	94	322	204	254	85	23	220																	
CHICAGO	296	41	135	223	374	332	138	353																
CLINTON, IOWA	229	103	152	114	402	335	205	323	144															
DANVILLE	194	143	85	219	273	235	37	257	140	238														
DECATUR	107	152	45	173	215	157	43	164	181	198	85													
DE KALB	253	23	117	181	333	323	144	325	65	95	173	165												
DIXON	258	63	108	142	374	314	154	303	103	44	195	156	42											
DUBUQUE, IOWA	231	152	204	145	451	387	256	366	177	82	259	249	125	94										
EAST ST. LOUIS	24	274	160	204	153	100	157	83	295	255	203	116	277	282	306									
EFFINGHAM	98	204	109	224	164	122	78	143	211	287	115	64	217	220	312	99								
ELGIN	283	22	132	203	385	343	149	340	42	224	158	179	37	64	142	292	222							
EVANSVILLE, IND.	187	320	255	340	143	101	209	139	296	380	175	181	342	344	436	166	117	324						
FREEPORT	294	98	146	179	412	352	202	341	113	59	234	193	53	37	83	320	258	73	434					
GALESBURG	165	151	97	45	336	258	139	250	185	71	172	132	145	99	122	183	195	174	341	127				
HARRISBURG	151	325	225	323	31	33	200	77	332	376	187	175	338	335	411	129	122	344	52	373	311			
INDIANAPOLIS, IND.	282	220	173	307	305	252	124	283	182	325	90	173	246	283	376	240	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	344		
JACKSONVILLE	81	214	101	119	248	190	120	145	236	170	156	73	216	198	221	85	123	233	252	225	104	207	244	
JOLIET	247	25	97	190	352	309	125	305	46	133	115	145	54	93	187	257	129	43	253	124	147	310	152	201

A mileage distance chart shows how far it is from one city to another. The chart above shows the distance in miles between major cities and towns.

If you wanted to find the distance between East St. Louis, Illinois, and Indianapolis, Indiana. First trace down the column that says East St. Louis. Then find the row that says Indianapolis, Indiana. Trace across the row and find the point where the two cities intersect, or meet. That number is the miles between the two cities. Look at the chart, the 240 miles has been circled for you. Now use the chart to answer the questions below.

1. The distance from Burlington, Iowa, to Alton, Illinois, is_____miles.
2. The distance from Decatur, Illinois to Champaign, Illinois is___miles.
3. The distance from Clinton Iowa, to East St. Louis,Illinois , is ___miles.

Activity 26 - Reading and Understanding Tables

Objective (s): Participants will be able to

1. Become familiar reading tables
2. Interpret data presented in tables

Material Needed: Pencil

You Need to Know:

When you want only certain facts, getting them for a table is usually much easier. A table has columns and rows of data. Columns are read up and down. Rows are read from side to side. A table may be as simple as two columns and two rows or it may be a complex as twenty columns and twenty rows of data. All of the data in a certain column is related in some way. Likewise, all of the data in a certain row is related in some way. Tables may include abbreviations or symbols and a key to explain what they mean.

Directions: Use the tables that follow to answer the questions.

Comparison of Weekly Earnings by Occupations

	Average Weekly Earnings		Women's Pay as Percentage of Men's
	Women	Men	
Postal clerks	$347	$359	97%
Nurses, dietitians, therapists	$292	$305	96%
Health technicians	$253	$299	85%
Textile workers	$175	$206	85%
Secondary school teachers	$290	$347	84%
Social workers	$263	$322	82%
College teachers	$349	$448	78%
Food-service workers	$138	$176	78%
Computer specialists	$335	$439	76%
Lawyers	$397	$532	75%
Editors, reporters	$286	$389	74%
Scientists	$325	$455	71%
Accountants	$277	$400	69%
Cashiers	$149	$216	69%
Engineers	$348	$503	69%
Assemblers	$186	$272	68%
Office-machine operators	$201	$296	68%
Bookkeepers	$203	$306	66%
Factory inspectors	$204	$314	65%
Office managers	$255	$392	65%
Retail-sales clerks	$140	$216	65%

1. According to the table, what is the average weekly pay for a woman computer specialist?________________________________

2. Of those listed, in how many occupations do women average more pay than men?________________

3. On average how much more do men cashiers make per week than do do women cashiers?__________________________

4. What type of comparison or relationship is presented in this graphic?____

Activity 26 - Reading and Understanding Tables, Continued

A Parent's Guide for Immunizations of Children

Immunization	Age (months)						
	2	4	6	12	15	18	60 (5 years)
Diphtheria	x	x	x			x	x
Whooping cough	x	x	x				
Tetanus	x	x	x			x	x
Polio	x	x	x			x	x
Measles					x		
German Measles					x		
Tuberculosis (TB) Test				x			

1. What is the subject of the table?
____

2. A parent brings in her six-month-old child for his immunization. What immunizations will the child receive?______________________

3. A parent brings in her 15-month old child for two immunizations. What are they?____________________________

4. A parent has one-year old twins. She wants to know what they must take?______________________________________

Activity 27 - Reading and Understanding Tables in the Workplace

Objective(s): Participants will be able to

1. Become familiar reading tables.
2. Interpret data presented in tables.

Oven Profile - Oven C, May 5, 1992

TOP	ZONE	1	2	3	4	5	6	7	8
	TEMP	400	585	500	510	400	300	425	420
	PRES	10	20	22	19	20	18	5	7
	BURNERS	ON	ON	ON	ON	ON	ON	OFF	ON
BOTTOM	ZONE	1	2	3	4	5	6	7	8
	TEMP	300	500	525	425	375	370	350	300
	PRES	10	12	5	1	0	0	1	0
	BURNERS	ON	ON	ON	ON	ON	OFF	OPFF	OFF
	ZONE	1	2	3	4	5	6	7	8
	FANS	OFF	OFF	ON	ON	ON	OFF	ON	OFF
	DAMPERS	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED
	COMMENTS								

1. What is the temperature in zone 4 of the top portion of the oven?____

2. Are the burners on in Zone 1? (check one) Yes____ No____

3. How many zones are recorded on the table?________

Activity 28 - Reading and Understanding Graphic Measurements

Objective (s): Participants will be able to

1. Become familiar with graphic measurements
2. Practice reading graphic measurements

Material Needed: None

You Need to Know:

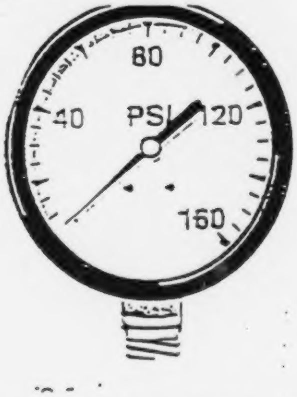
The Nabisco facilty has various graphic measurements that employees use to record data in order to monitor some part of the production process. For example, employees in the mixing department monitor the mixing process by checking the potentiometer read-out. Likewise, bake shop employees are constantly checking temperature gauges. They are also familiar with Scorpion Charts. (A Scorpian is a device that measures variation in temperature in different parts of an oven.)

A gauge is an instrument that measures pressure, temperature, and levels. One of the most common temperature gauges is the thermometer. Many people use a thermometer to measure heat and cold in ovens or refrigerators. Water heater installers use a thermometer test gauge when they are trying to find problems with a water heating system. If a house has a gas heater, it has a gas gauge that measures how much gas is used. There are also pressurized gauges, like gas, air, or water gauges. Pressurized gauges display the amount of pressure. However, they can also indicate high or low pressure.

Directions: Turn to the next page. Look at the different types of guages. Then move on to the next practice activity.

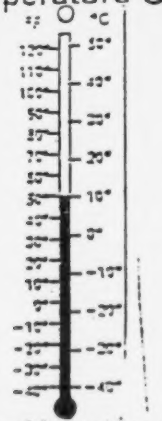
Activity 28 - Reading and Understanding Graphic Measurements, Continued

Pressure Gauge


80
40
PSI
120
160

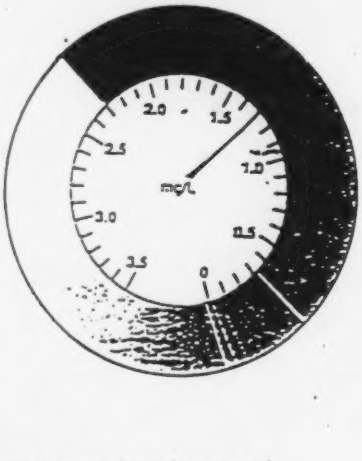
Shows a certain amount of pressure or level (e.g., gas,water, air gauges)

Temperature Gauge



Measures heat and cold in ovens or refrigerators (e.g., test gauge) for water heater.

Level Gauge


2.0
1.5
2.5
1.0
mg/L
3.0
0.5
3.5
0

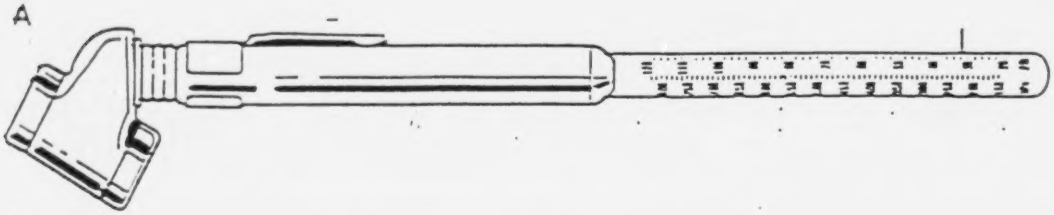
Measures levels and standards (e.g. level gauge).

Activity 28 - Reading and Understanding Graphic Measurements, Continued

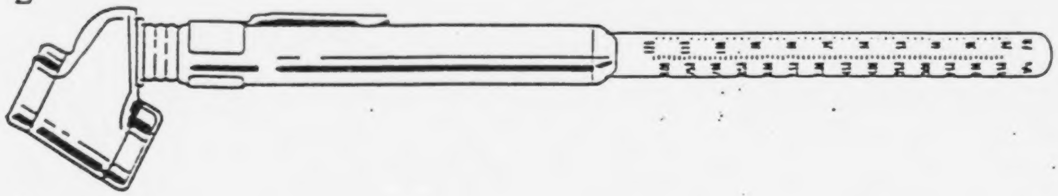
Let's look at the air pressure gauges below. Gauge A has a mark at the 32 psi unit. Using Guage A as your guide, place a mark at the correct air pressure for tires B and C.

Tire B: 40 pounds
Tire C: 110 pounds

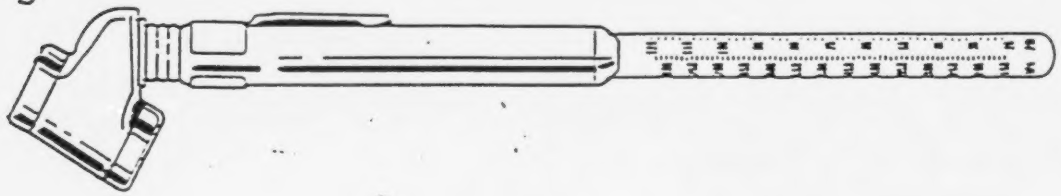
A



B



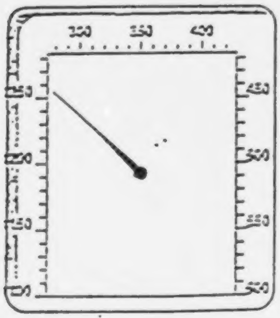
C



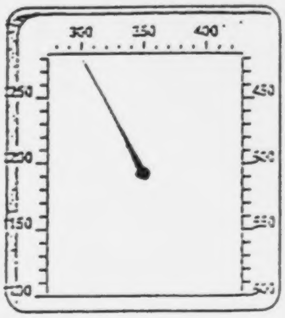
Activity 29 - Reading and Interpreting Thermometers

Thermometers measure temperature. Thermometers measure temperature in either Fahrenheit (F) or Celsius (C) readings. One common thermometer is a clinical thermometer. A clinical thermometer is used by doctors' offices, medical clinics, and hospitals. Clinical thermometers measure body temperature.

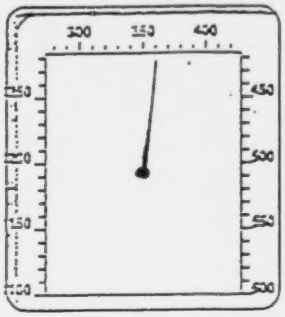
Directions: Now let's practice reading thermometers. Here is a baking scenario. The Nabisco bakery has been having problems with certain products baking properly. After five unacceptable batches, the employees to do a test to determine if the oven is malfunctioning. Read the temperature on each thermometer below. Then record the temperatures in the space provided.


300
350
400
250
200
150
100
450
500
550

A


300
350
400
250
200
150
100
450
500
550

B


300
350
400
250
200
150
100
450
500
550

C

Time	Thermostat Setting	Actual Temperature
1. 7:45 A.M.	A. 325°F	A.
2. 9:45 A.M.	B. 375°F	B.
3. 2:15 P.M.	C. 450°F	C.

Activity 30 - Reading and Interpreting Potentiometer

You Need to Know:

Potentiometer charts are used by employees in the Mixing Department. A Potentiometer is a gauge on the mixing machine that prints out a snapshot of what is happening as the dough is being made. This print out helps employees to analyze the texture of the dough. The texture of the dough is very important to the production process. This chart allows employees to determine the how tight or loose a dough may be. For example, the read-out may show a high resistance. The problem may be too much flour or too much water.

A sample of a cookie dough guideline is attached. The chart shows three stages of the process. In the Cream-Up stage the sugar and oils are being mixed at the start of the process. The second stage is the Shortening Cream-Up is all liquid, oils are mixed. Then the flour is mixed in the dough mix stage.

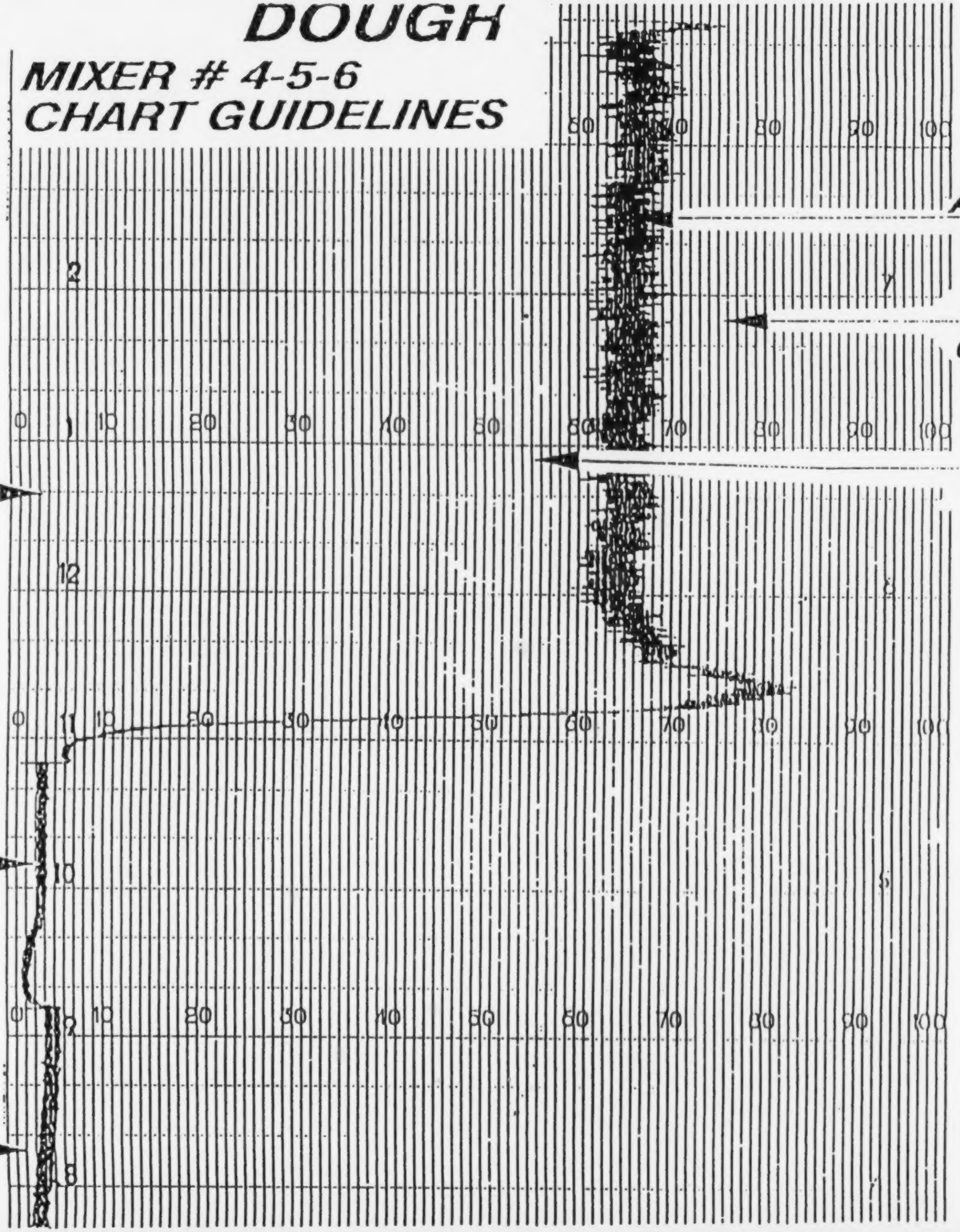
When the reading the chart, the vertical (up and down lines) is a representation of the time the dough has been mixing. The horizontal lines is a representation of the resistance of the dough. If the resistance is charted above or below the control limits, a supervisor is called. In the case some products, a dough with soft resistance is more acceptable. Employees monitor charts on the mixer at regular intervals.

Directions: Now you know how a Potentiometer Charts is used in the Mixing Department. Now think of other charts or tables you use on the job. Write the name of the chart and its use in the spaces provided.

Chart Name	***Chart is used to...***
______________	____________________________
______________	____________________________
______________	____________________________

DOUGH

MIXER # 4-5-6
CHART GUIDELINES



AIM POINT 65

UCL LIMITS 75

CALL SUPERVISOR

LCL LIMITS 55

CALL SUPERVISOR

DOUGH MIX

SHORTENING CREAM UP

CREAM UP

USING MEAL

PINK

Activity 31 - Understanding the Purpose of Control

1. Interpret data using charts and make decisions based on the data.
3. Plot data points on charts.

Materials Needed: Pencil, Attached handout of decision rules

You Need to Know:

Nabisco employees have to make decisions on a daily basis about improving their work processes. They do this by using Process Operating Guidelines (POG). They use control charts to collect facts and data. Then they decide what should be changed to improve the quality of the product. Data collection is very important because it helps employees identify the causes of problems and monitor the production process.

What kind of problems might occur during the production process? The list of possibilities is great. However, a few are listed below:

- dough temperature out of control
- dry weights out of control
- stack heights out of control

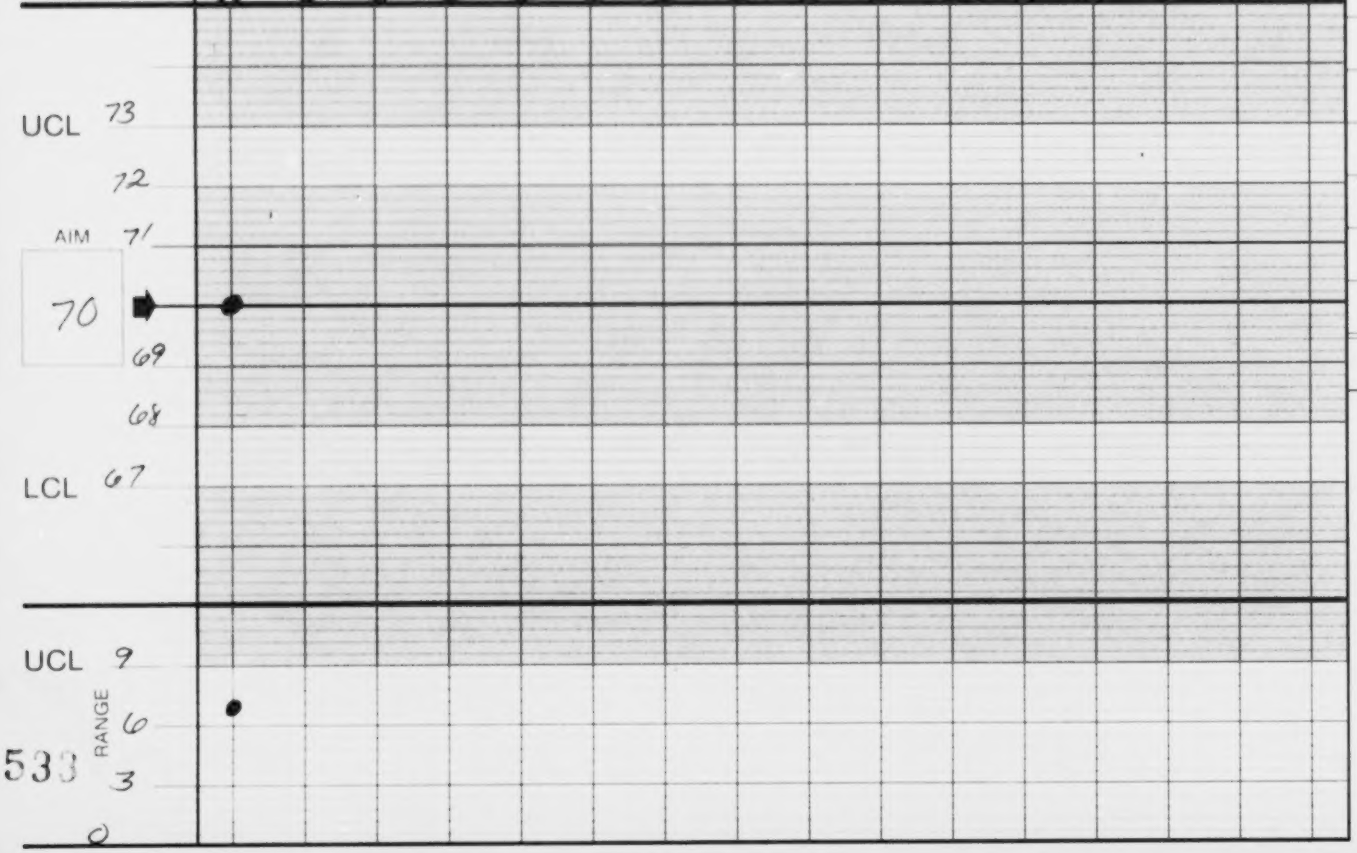
In order to get a handle on what temperatures are acceptable for the doughs, an employee will take samples of dough at particular times during a shift. The data collected is plotted on a control chart manually or by computer. Once the data is collected, employees use standard decision rules to make decisions about the production process. In this activity, you will plot data manually and learn to read a computer generated chart.

Directions: Look at the sections of a control chart that are outlined on the attached pages. You will be guided through the process of manually completing a control chart.

CONTROL CHART NB-5260-E

DATE	PRODUCT	SHIFT	ATTRIBUTE	LINE NO	OPER
9/16/95	#019	2	Wet-Weights	1	Denner #14962

TIME		3:30	4:00	4:30	5:00	5:35	6:00	6:25	7:00	7:30	8:00	8:30	9:00	9:30	10:00	10:30	11:00
ANALYSIS E	1	74	72	69	70	72	76	76	70	73	71	68	75	71	70	70	74
M	2	69	69	72	74	71	75	72	74	70	75	69	74	72	75	69	67
W	3	67	65	68	65	68	65	67	66	70	66	73	64	67	64	67	69
	4																
	5																
	6																
SUM	Σ	210															
AVERAGE	X̄	70															
RANGE	R	7															



533

ASSIGNABLE CAUSE LOG

ACTION	CAUSE

DECISION RULES

1	IN RED
2 OF 3	IN YELLOW (ALL ON SAME SIDE OF AIM)
5	IN A ROW (ALL ON SAME SIDE OF AIM)
5	IN A ROW IN AN UPWARD OR DOWNWARD TREND (BETWEEN CONTROL LIMITS)

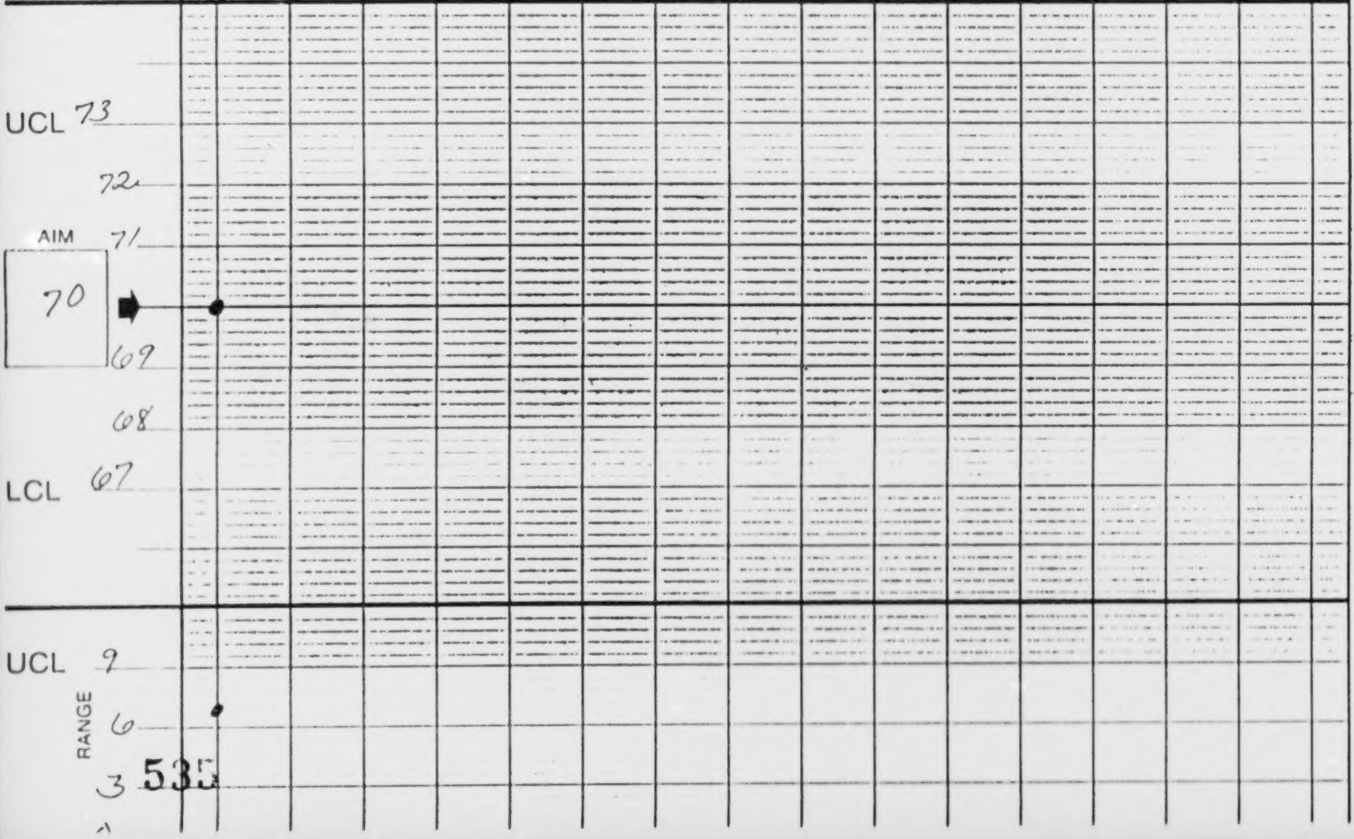
531

INVESTIGATE/REACT/DOCUMENT

CONTROL CHART NB-5260-E

DATE 9/10/95
PRODUCT #019
SHIFT 2
ATTRIBUTE Wet Weights
LINE NO 1
OPER Denner #14962

TIME		3:30	4:00	4:30	5:00	5:35	6:00	6:25	7:00	7:30	8:00	8:30	9:00	9:30	10:00	10:30	11:00
ANALYSIS E	1	74	72	69	70	72	76	76	70	73	71	68	75	71	70	70	74
M	2	69	69	72	74	71	75	72	74	70	75	69	74	72	75	69	67
W	3	67	65	68	65	68	65	67	66	70	66	73	64	67	64	67	69
	4																
	5																
	6																
SUM	Σ	210															
AVERAGE	$\bar{X}$	70															
RANGE	R	7															



ASSIGNABLE CAUSE LOG

ACTION	CAUSE

DECISION RULES

1	IN RED
2 OF 3	IN YELLOW (ALL ON SAME SIDE OF AIM)
5	IN A ROW (ALL ON SAME SIDE OF AIM)
5	IN A ROW IN AN UPWARD OR DOWNWARD TREND (BETWEEN CONTROL LIMITS)

536

INVESTIGATE/REACT/DOCUMENT

Directions Continued: The top part of the control chart includes the following: the date (September 15, 1995) , product name (Product #019), shift number (2) , the type of data being collected (attribute), production line number (1), and the operator's name (Denner).

In this case, wet weights are being monitored for Product #019. Denner collects data or samples every half-hour, starting at 3:30 p.m. His samples are collected from three conveyor belt areas, the East, Middle, and West. Reading down the row, under the 3:30 p.m., his weights were 74, 69, and 67. He does the same procedure for the rest of the samples. Look at the times the samples were taken. Did he take all samples on time?

Yes___ No___

After taking the samples, Denner computed an average of the samples. for example, at 3:30 p.m., he added 74+69+67=210. Then he divided 210 by 3 to get an average of 70. After obtaining his average, Denner computed the range by subtracting the highest number from the lowest, 74-67 = 7. Now help Denner out by computing the average and range of the rest of the samples. Use the exact numbers, do not round off.

Denner knows that the target (aim) weight is 70. The aim is also called the control limit. If all weights were hitting the aim, then he has a really good control of the process. However, some variation is expected in the process, but within acceptable limits. The Upper Control Limit is 72, meaning no weights should average above this limit. The Lower Control Limit is 67, so no average should weigh less than 67. Ideally, the points plotted, representing the collected data, should fall randomly between the upper and lower control limits, fluctuating above, below, and on the aim or target line. Therefore, Denner continues to monitor his process by plotting the data points to determine how his process is running.

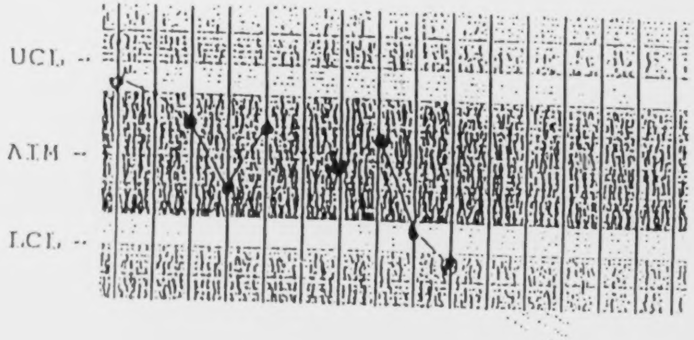
Let's help Denner out by plotting the average and range of the wet weights. The first five have been plotted for you. After plotting the points, draw lines to connect the data points (dots). Look at the results. Denner would analyze the results and apply decision rules when necessary.

DECISION RULES

As you monitor the process, watch for these examples. If any of the examples below occur on your control chart, investigate immediately and take action if necessary.

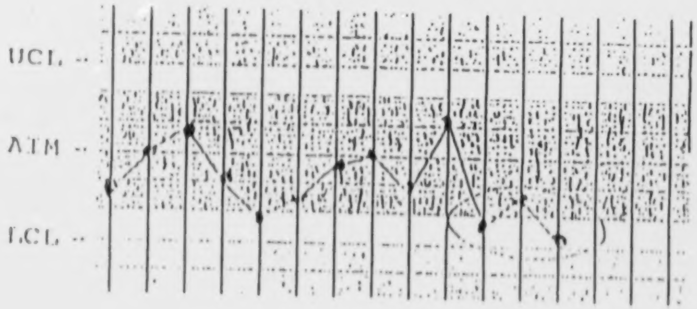
1. POINT BEYOND UPPER OR LOWER CONTROL LIMIT

When a point is plotted above the upper control limit, or below the lower control limit, adjust the process immediately. Take a recheck and continue this procedure until point is within the acceptable limits. Plot all checks.



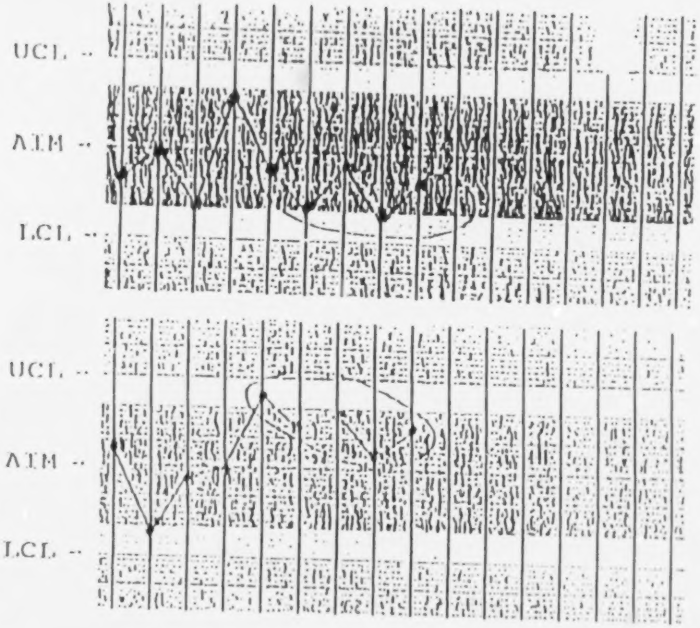
2. 2 OUT OF 3 POINTS IN YELLOW

When 2 points out of 3 fall in the yellow, on the same side of the aim line, a shift may be forming. Check for possible causes and notify your supervisor. Make adjustments if instructed. Take a recheck if any adjustment is made and continue this process until the points fall nearer the aim.



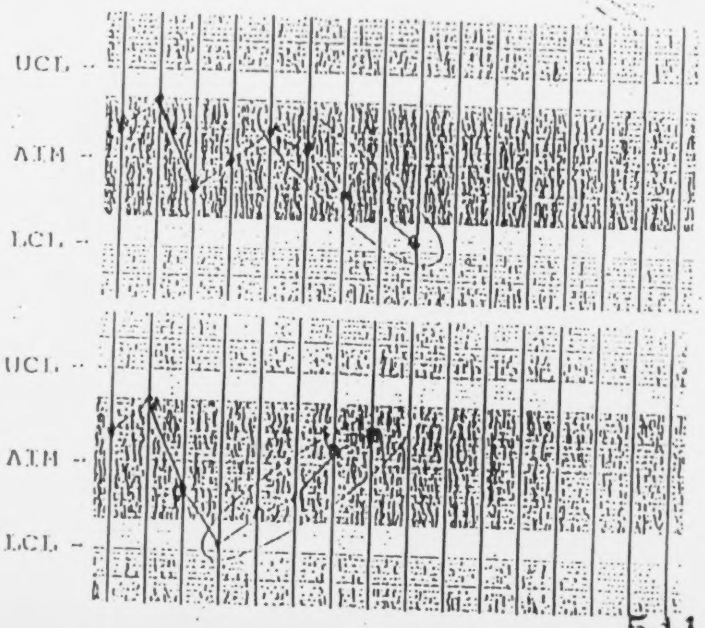
3. SHIFT OR RUN.

When 5 or more points in a row are plotted between the aim line and either the upper or lower control limits, adjust the process and recheck immediately. Check for any changes such as in temperatures, raw materials, or parts wearing out. Continue to monitor the process making adjustments and rechecks to ensure the shift has been corrected.



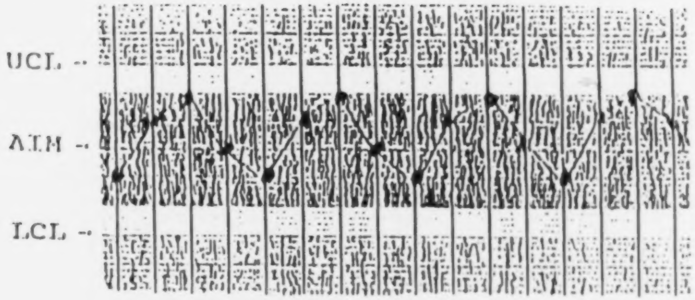
4. TREND

A trend is forming when 5 or more plotted points in a row form an upward or downward pattern between the upper and lower control limits. The trend may cross the aim line. If this happens, notify your supervisor.



5. PERIODICITY

When the points you have plotted form a repeating pattern, notify your supervisor.



The decision rules are summarized on the bottom right corner of the control chart. After reading about the decisions, summarize in the blanks below, what decision should be made about this process.

Summary of Decision____

____

____

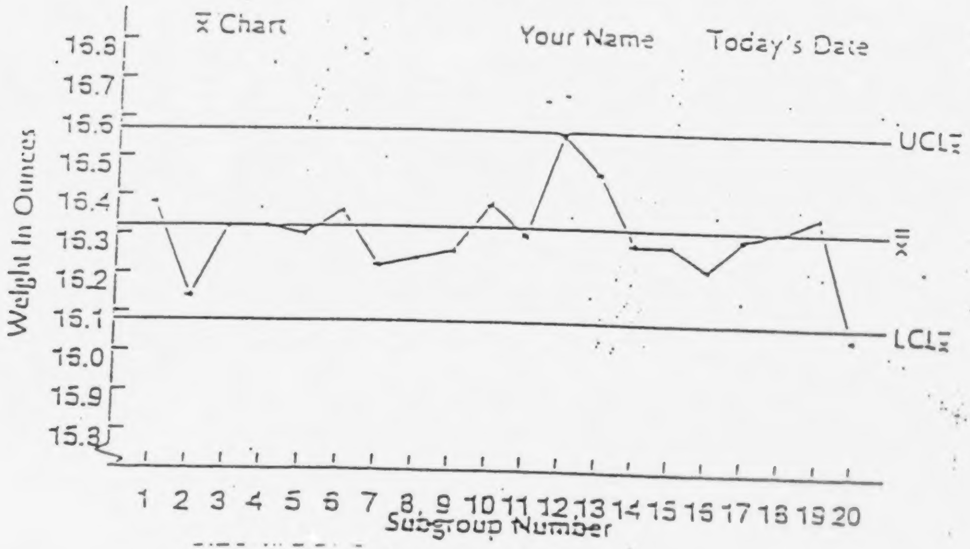
____

Activity 31, Continued

Directions: Use the decision rule handout to determine which rule each of the example charts represent.

Chart #1- Decision Rule________________________________

Wheat Thins - 16 oz.
Shift 3, Line 7



Line: Oreo

Chart #2 - Decision Rule_____________________________

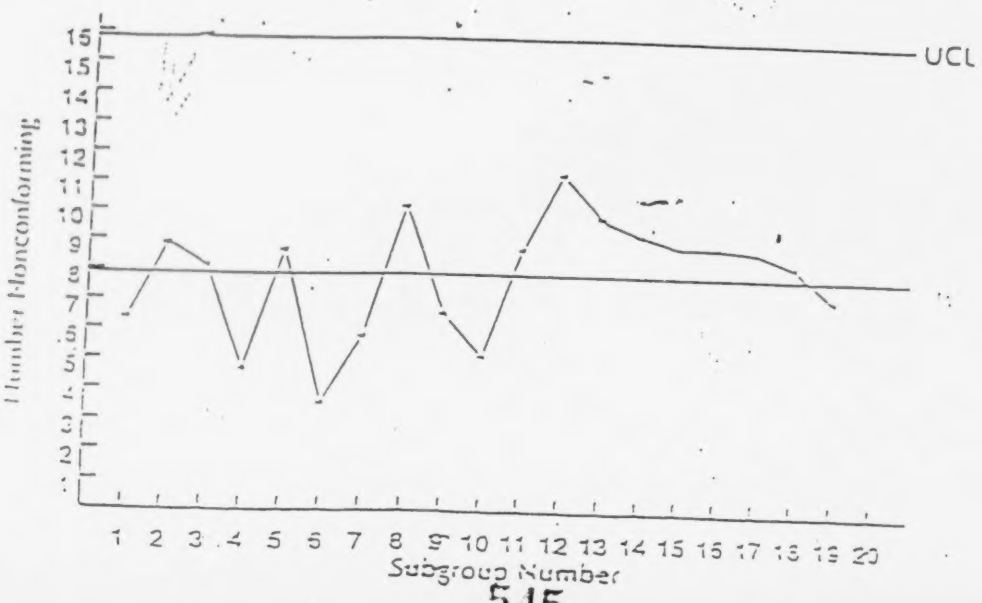
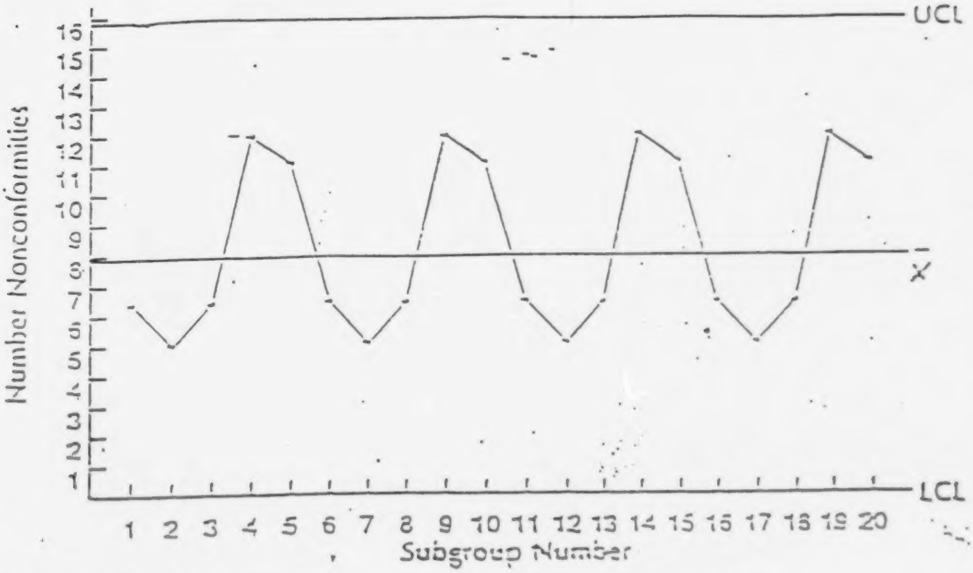


Chart #3 - Decision Rule________________________

Line: Chips Ahoy!



Activity 31 - Understanding and Using Control Charts

Material Needed: Blank Control Chart

Directions: Plot the range on a blank control chart for the following scenario. You are making Cheese Nips and the weight samples are ranging between .5 and 1.5. The lower control limit for range is 0. The upper control limit for this chart is 2. Plot the ranges below on the control chart.

.5
.7
.8
.1
1.0
1.5
1.2
.9
1.5
.6
.6
.5
1.5
.4
1.3
1.4

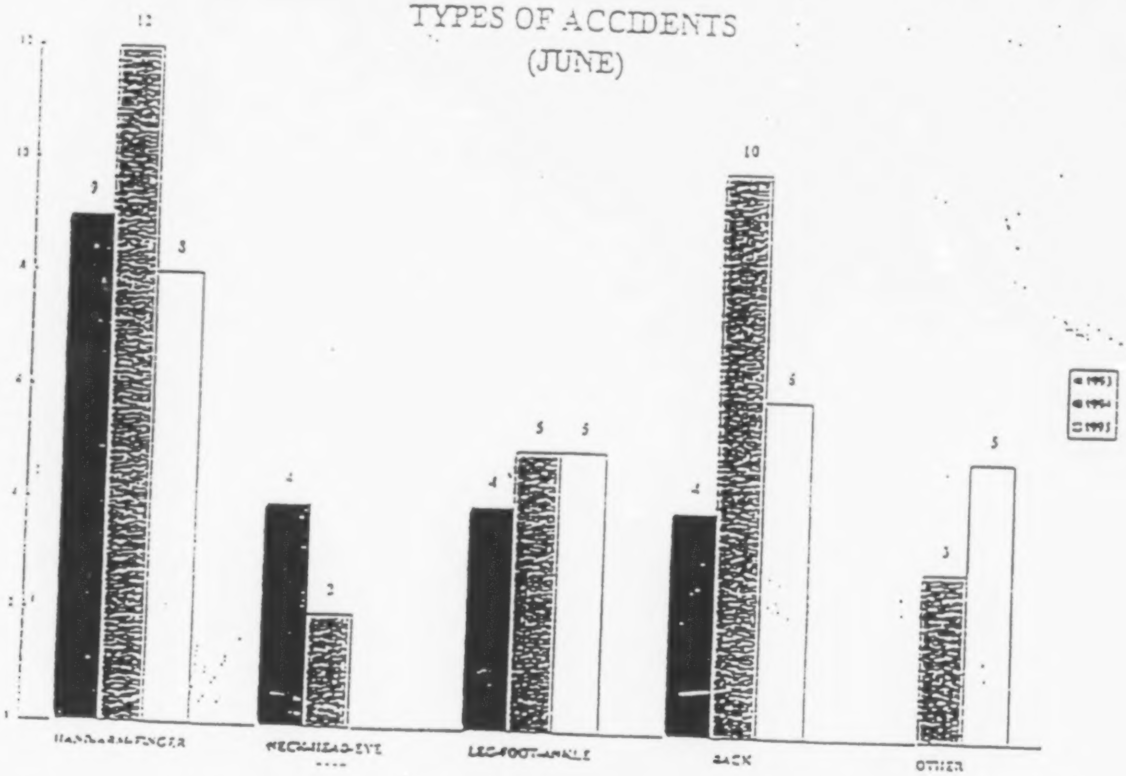
Activity 32 - Using Graphs & Charts in the Workplace Review

Objective (s): Participants will be able to

1. Understand trends relationships and decision making.

Material Needed: Pencil

Directions: Read the graphs and charts below. Use the tips you've learned in this module to answer the questions.



1. What is the title of this graph?______________________________

2. What type of data is represented on the x-axis?_________________

3. What type of units are represented on the y-axis?______________

4. Is this a vertical graph? Yes____ No____

5. In what two years were the leg-foot-ankle accidents the same?
____

6. What conclusion can you draw about the graph regarding the number of accidents that have occurred in June of 1994?______________

7. Compare the number of back accidents over the three year period?
____

Activity 32 - Using Graphs & Charts in the Workplace Review

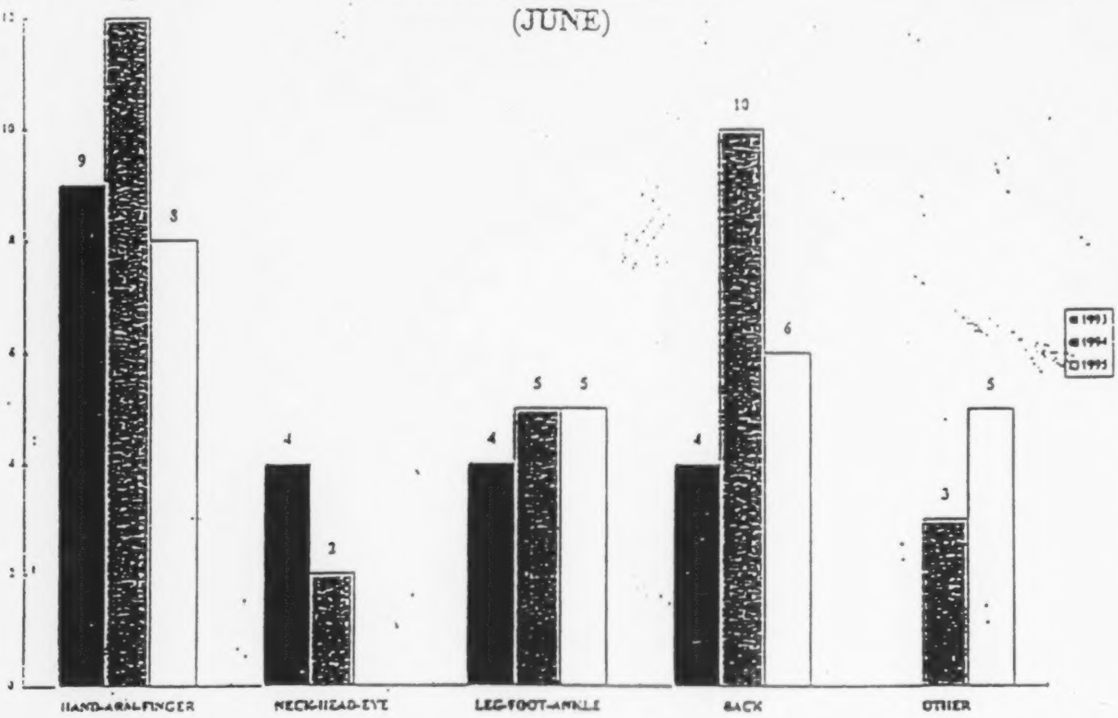
Objective (s): Participants will be able to

1. Understand trends relationships and decision making.

Material Needed: Pencil

Directions: Read the graphs and charts below. Use the tips you've learned in this module to answer the questions.

TYPES OF ACCIDENTS
(JUNE)

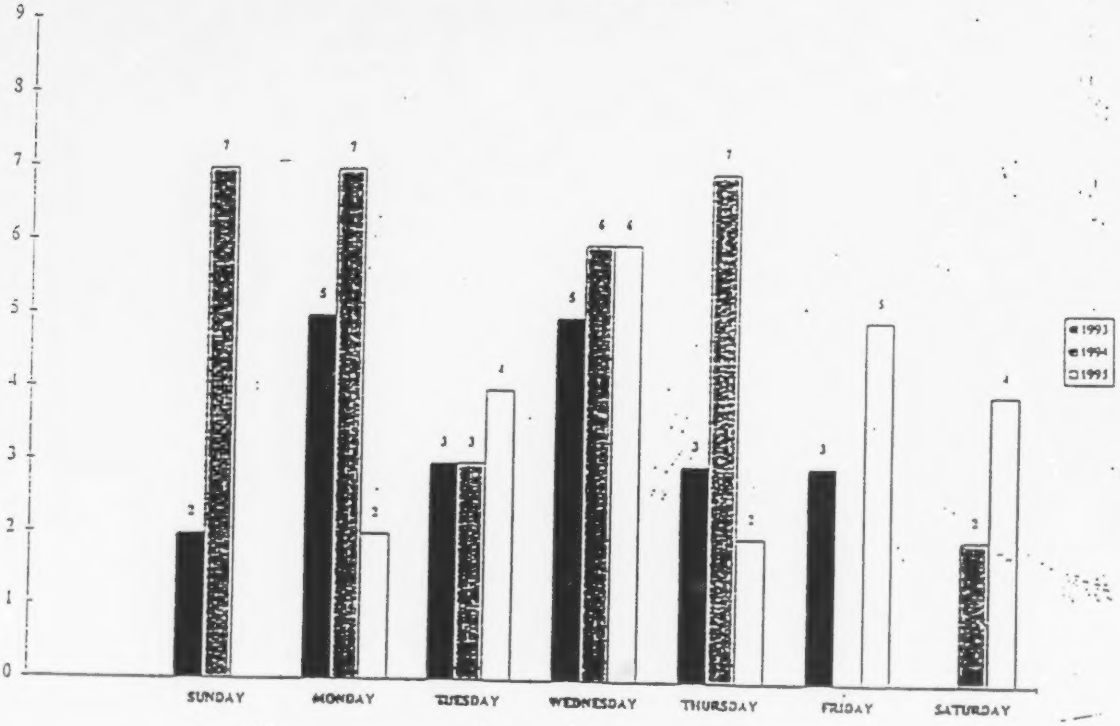


1. What is the title of this graph?____________________________

2. What type of data is represented on the x-axis?______________

3: What type of units are represented on the y-axis?____________

ACCIDENTS BY DAY



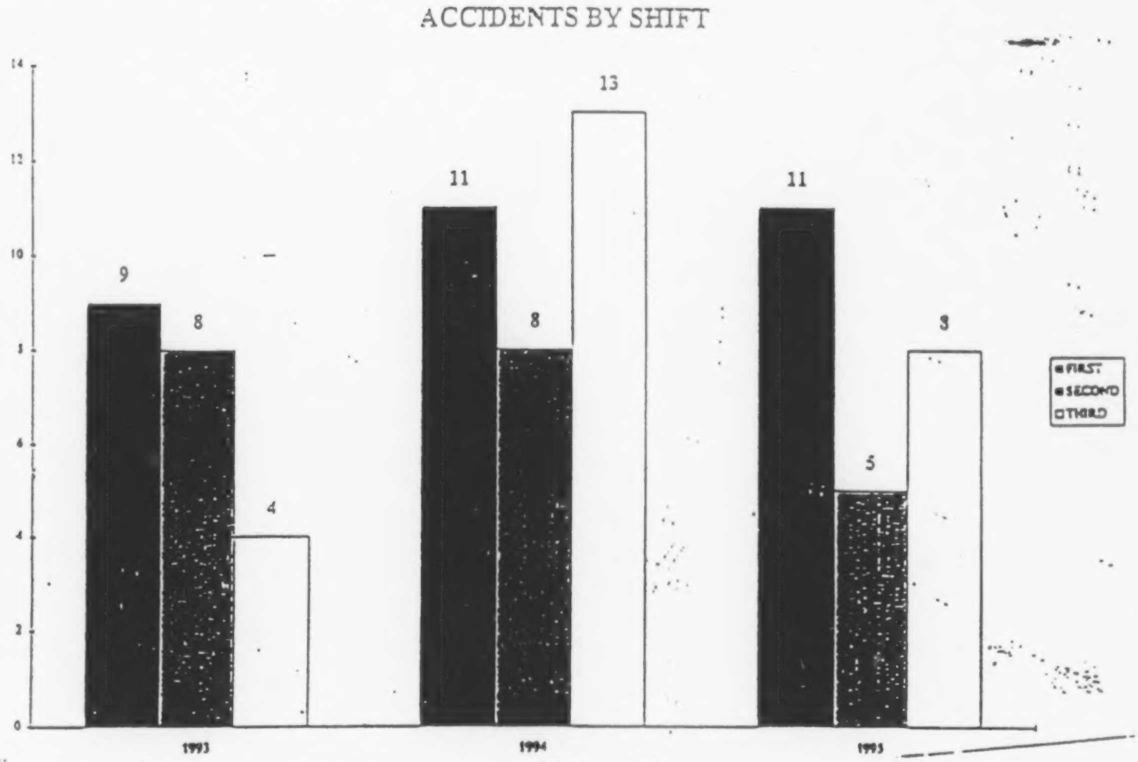
1. In 1994, which days show the same number of accidents per day?

____

2. In 1993, which day show the least amount of accidents per day?

____

3. In 1995, there were accidents no recorded accidents on Sunday?
(circle one) T or F



1. Which shift has recorded the highest number of accidents in 1994?
____

2. Based on the data how would you summarize the accidents by shift over the time periods indicated?______________________________

Directions: Read the table below. Answer the questions.

DEPARTMENT	HOURS	JUNE ACCIDENTS	Y-T-D ACCIDENTS	JUNE LW D	Y-T-D LWD
MAINT.	23000	0	4	0	0
MIXING	16360	2	1	0	1
BAKING	16800	0	2	0	1
PACKING	62745	1	3	0	2
ENVIRON.	6609	0	0	0	0
WAREHOUSE	1345	0	0	0	0
SALARIED	20209	0	1	0	1
TOTAL	147068	3	11	0	5

1. According to the table, the Packing Department recorded the highest number of hours? (circle one) T or F

2. What was the total number of hours for all departments?__________

3. What was the June accident rate for the Mixing Department?________________________

4. What is the Y-T-D Accident Rate for this facility?

____

Directions: Look at the computer print outs of various data collected by Nabisco employees as they monitor the production process. Then answer the questions.

Chart #1 Product A

1. What are the upper and lower control limits shown on the chart? ____________________

2. The first sample on August 11 was at 7:40 a.m. Express that time in military time.____________

3. In your own words, explain what information you understand is being shown in this chart?____________________
____

Product A, Shift 2, August 7-11, % Moisture

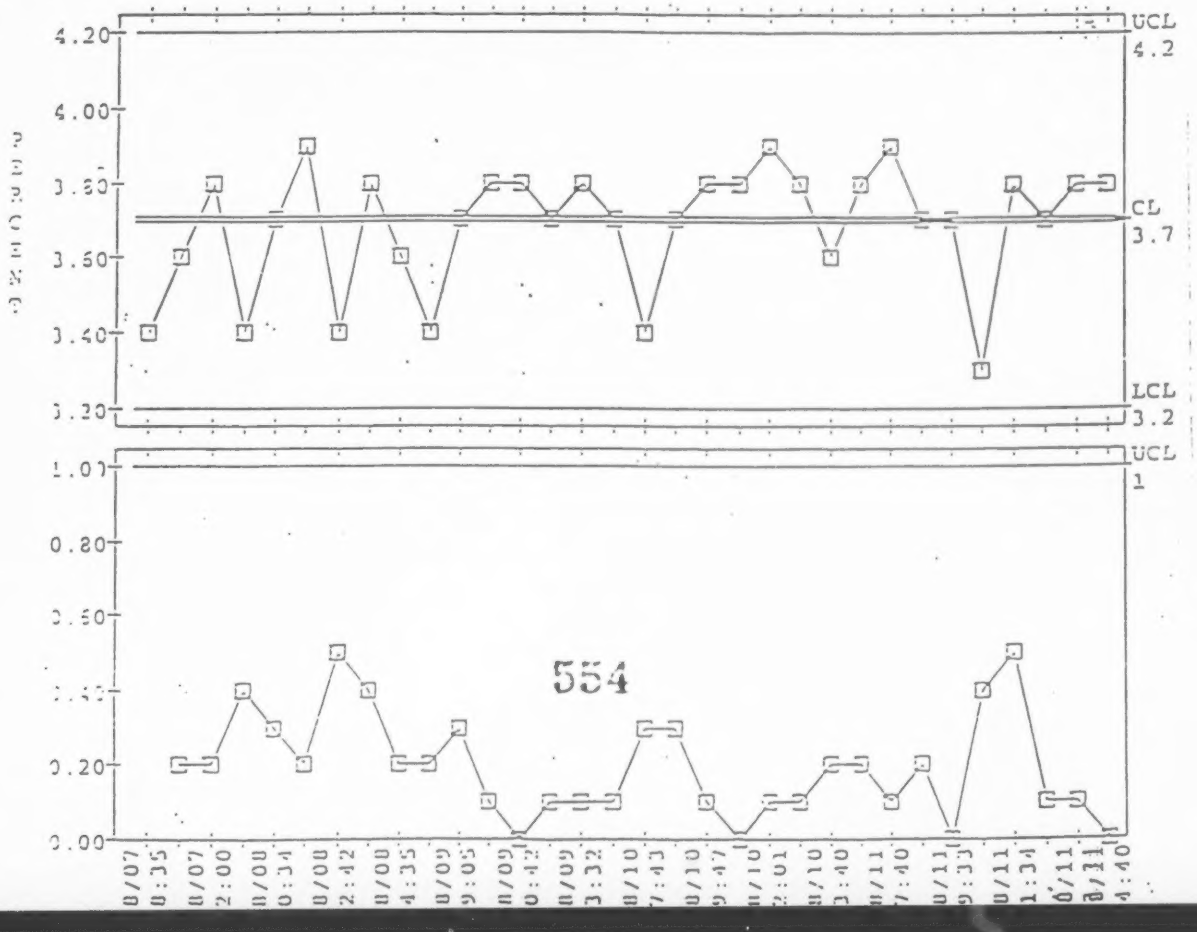
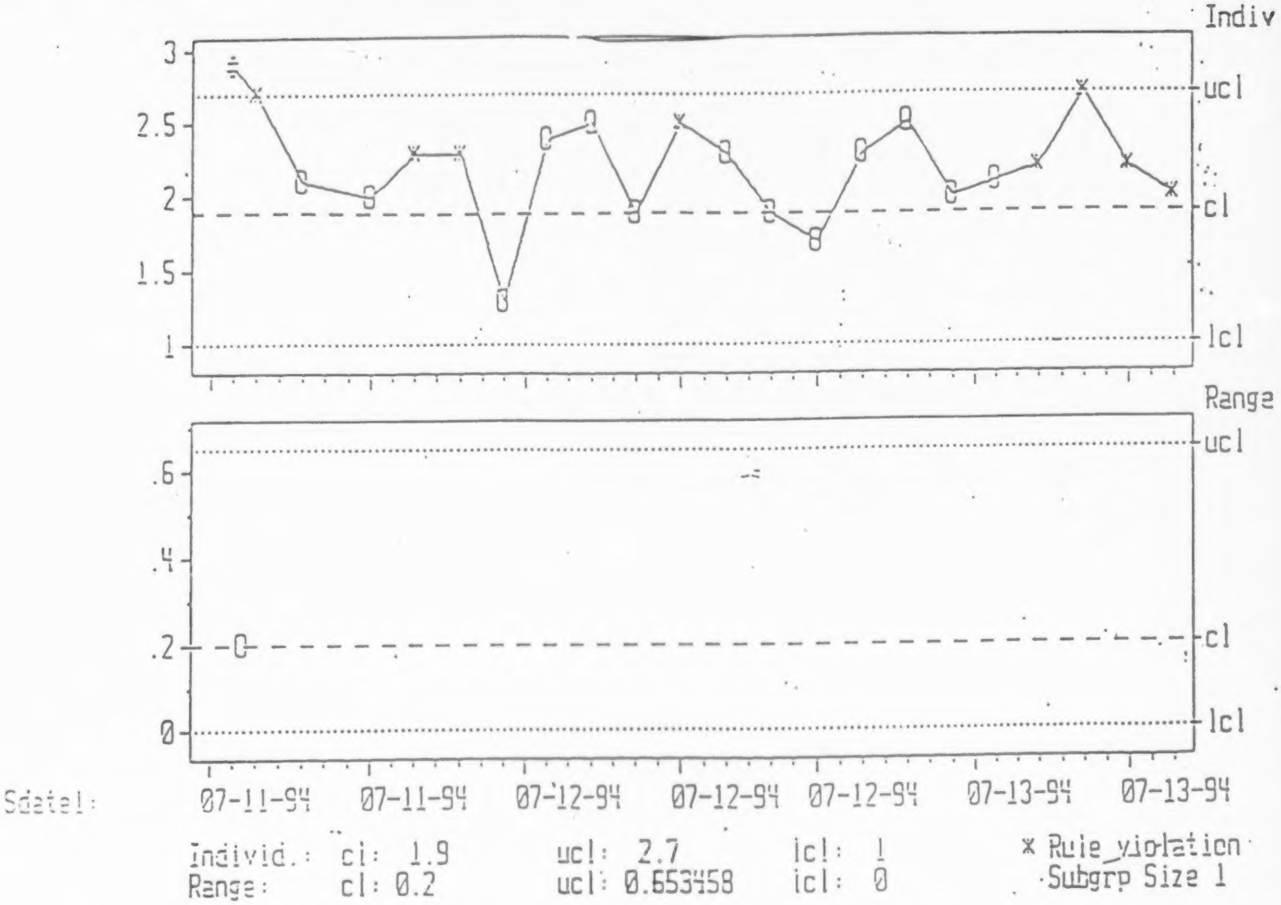


Chart #2

Product B, Shift 3, July 11-13, % Moisture



1. What is the upper control limit shown on the chart?

   ____

2. According to the data on the chart, numerous rule violations occurred. True____ False____

3. What symbol represents a rule violation on this chart?______

   ____

4. In your own words, explain what information you understand is being shown in this chart?______________________________________

Reading Comprehension

To the Facilitator:

The curriculum is color coded to indicate levels of difficulty. Yellow represents Minimum Level, blue represents Moderate Level, and Pink represents Maximum Level.

These levels correlate to the benchmarks established by employees and the results of the assessment process validated for selected jobs at the Nabisco Richmond Facility.

Reading
YELLOW

Activity: 1 - Workplace Vocabulary

Objective(s):
1. Recognize and read workplace vocabulary words.
2. Change information from one form (syllables) to another form (full word).
3. Transfer information accurately.

Materials Required:
1. Workplace Vocabulary Lists

You need to know:

1. Syllables are parts of words. (Syl-la-bles)
2. Some words have only one syllable. For example: salt
3. Most words have more than one syllable.
   For example: sodium = so-di- um
4. Most of the time, syllables need to have a vowel to help them make the sounds that distinguish words from each other.
   The vowels are: a, e, i, o, u and sometimes y.

Directions:
1. Look at the list of workplace words and phrases on the opposite page.
2. The words and phrases have been separated into syllables.
3. Try to sound out or read the syllables.
4. Say the syllables together until you think you recognize the word or phras
   Have you heard the word before?
5. Write the word or phrase (group of words) you recognize in the space ne:
   to the syllables of the word.
6. What other vocabulary words can you think of from your work area?
7. Add those words to the list. Ask for help if you need it.

Activity: - Workplace Vocabulary (continued)

Syllable	Word	Syllable	W
1. ad-just-ments			
2. a-ver-age			
3. con-trol charts			
4. de-part-ment			
5. dough build-up			
6. dough edg-es			
7. dough hop-per			
8. dough sam-ples			
9. gra-vi-ty			
10. guage rol-ler			
11. mal-func-tion			
12. mon-i-tor			
13. o-ven-band			
14. re-si-due			
15. salt hop-per			
16. salt read-ing			
17 suc-tion hose			

Workplace Vocabulary - Sanitor/Utility

Syllables	Word
o ver heads	
sa ni tize	
fil ter bags	
brea ther bags	
mag ne tic se pa ra tor	
flo ta tion u nit	
mez za nine	
sif ter tail ings	
con ta mi na tion	
in fes ta tion	
pher mone	
fu mi ga tion	
phos tox in	
me thyl	
py re thrum	
gas tech	
mo dule	
re si du al spray	
ha zar dous ma te ri al	
ex haust	
fork lift	
flo ta tion u nit	
in ven to ry sheet	
cer ti fi ca tion	

Sanitor/Utility cont.

Syllable	Word
e le va tor pits	
mag ni fy ing glass	
e mer gen cy kit	
neu tra lize	
a ci dic	
pes ti cide	
meal grin ders	
che mi cal sub stan ces	
phy si cal ha zard	
e mer gen cy pro ce dures	
pro tec tive e quip ment	
safe ty man u al	
ha zard com mu ni ca tion	
com bus ti ble	
cor ro sive	
car ci no gen	
ha zar dous in gre di ent	
flam ma ble	
per mis si ble ex po sure li mit	
dis po sa ble	
dis in fec tant	
res pi ra tor	
cer ti fied ap pli ca tor	

Activity: 1 - Workplace Vocabulary

Objective(s):

1. Recognize and read workplace vocabulary words.
2. Change information from one form (syllables) to another form (full word).
3. Transfer information accurately.

Materials Required:

1. Workplace Vocabulary Lists

You need to know:

1. Syllables are parts of words. (Syl-la-bles)
2. Some words have only one syllable. For example: salt
3. Most words have more than one syllable.
   For example: sodium = so-di-um
4. Most of the time, syllables need to have a vowel to help them make the sounds that distinguish words from each other.
   The vowels are: a, e, i, o, u and sometimes y.

Directions:

1. Look at the list of workplace words and phrases.

2. The words and phrases have been separated into syllables.

3. Try to sound out or read the syllables.

4. Say the syllables together until you think you recognize the word or phrase. Have you heard the word before?

5. Write the word or phrase (group of words) you recognize in the space next to the syllables of the word.

6. What other vocabulary words can you think of from your work area?

7. Add those words to the list. Ask for help if you need it.

Activity: 1 - Workplace Vocabulary (continued)

Syllable	Word	Syllable	Word

Activity: 2 - Abbreviations and Symbols (continued)

______ 1
______ 2
______ 3
______ 4
______ 5
______ 6
______ 7
______ 8
______ 9
______ 10
______ 11
______ 12
______ 13
______ 14
______ 15
______ 16
______ 17
______ 18
______ 19
______ 20
______ 21
______ 22
______ 23
______ 24
______ 25
______ 26

a.
b.
c.
d.
e.
f.
g.
h.
i.
j.
k.
l.
m.
n.
o.
p.
q.
r.
s.
t.
u.
v.
w.
x.
y.
z.

Activity: 2 - Abbreviations and Symbols

Objective(s):

1. Recognize workplace abbreviations and acronyms commonly used.
2. Change information from one form (whole word) to another form (abbreviation)

Materials Required:

Pen or pencil

You need to know:

1. Abbreviations are a short way to write a word.
2. Most abbreviations are made by taking some of the letters out of a word.
3. Some abbreviations are very different from their words.
4. Acronyms are a special kind of abbreviation. Acronyms are words that are made from the first letters of a phrase. Example: WOW stands for War on Waste at the Richmond Nabisco Facility.

Directions:

1. On the next page, put the letter of the abbreviation next to the correct word.

2. Can you think of any abbreviations used in your work area?

3. Add them to the list.

Abbreviations and Symbols

____ 1. Good Manufacturing Procedures

____ 2. Material Safety Data Sheet

____ 3. Occupational Safety and Health Administration

a. MSDS

b. OSHA

c. GMP

Activity: 3 - Personal Word Bank

Objective(s):

1. Transfer information from a source to a document and proofread.
2. Compile and maintain personal word bank of terms, abbreviations and acronyms.

***Materials Required*:**

1. Completed workplace vocabulary list
2. Personal word bank sheets

Directions:

1. Put a check by all the words on your vocabulary list that you need to learn more about.

2. Write the words and their abbreviation (if they have one) in your personal word bank on the page. You can get more sheets as you need them.

3. Proofread (check) the words to be sure you spelled them correctly.

4. Read the headings for each of the columns in the word bank.

5. Fill in the spaces with as much as you now know about each of your words.

6. Each day, add more information to your word bank as you learn more about your words.

7. Each day, add words that you need to learn more about to your word bank. Talk to your facilitator about how many words you should add to your word bank each day.

PERSONAL WORD BANK

WORD	ABBREVIATION OR ACRONYM	WHERE SEEN? (LABEL,FORM,SIGN)	WHERE HEARD? JOB OR DEPT. USED IN	WHAT IS IT?

Activity: 4 - Reading Safety Guidelines

Objective(s):

1. To recognize key words in safety rules.
2. To use logic in completing the meaning of safety rules.
3. To transfer information and proofread.

Materials Required:

1. Nabisco Safety Guidelines Sheet
2. Word List

You need to know:

1. To do any kind of job or task right, you have to know what the terms mean that are being used in the job.
2. You can understand many terms just by the context (the setting in which a word is used).
3. When you come across a new word, underline it or write it down. But don't think about the meaning of the word yet.
4. Read the sentence and understand the idea that is presented.
5. Once you understand the context, guess at the meaning of the new word. Many times you'll be right!

Activity: 4 - Reading Safety Guidelines (continued)

Directions:

1. Read the word list below. Ask for help with words you don't know.
2. Read the rules on the opposite page carefully. Think about the clues you get in each rule. Ask for help with words you don't know.
3. Think about the meaning of each of the rules and then fill in the spaces with a word from the list. Use each word only once.
4. Read the completed rules.
5. Do the rules make complete sense now? Ask for help if you need it.
6. Add any words you had trouble with to your word bank.

Word List

clogs
minor
spills
posted
unsafe
smoking
jewelry

lounges
qualified
littering
prohibited
operating
committee
emergency

medical
non-skid
production
equipment
supervision
training
evacuation

extinguisher
fork lifts
recommend
open-toed
transporters
safety signs
operate

Activity: 4 - Reading Safety Guidelines (continued)

In addition to the key essential safety rules, the following safety guidelines also apply to the Richmond Facility:

1. Observe all ______________ and/or restrictions.
2. ________________ is only permitted in the following areas: cafeteria, lounges and offices where posted.
3. Only ___________ operators are permitted to _________ transporters, forklifts, etc., for their intended use.
4. High-heels, _______, moccasins, sandals, and __________ shoes are ____________ while at work. Safe, __________ soles in good condition are _____________ for all employees.
5. Report and/or clean up ________ immediately to prevent falls. __________ is prohibited.
6. _________ may not be worn in ____________ areas. The only exception is wedding bands.
7. Stop and check for ____________ and other moving equipment prior to entering all walkways.
8. Broken/damaged _______________ (stools, ladders, etc.) must not be used and must be reported to _______________ at once for corrective action.
9. All "Safe _____________ Procedures" (chemical handling, confined space entry, machine/equipment operation, etc.), as covered in a _____________ class or as _________, must be followed.
10. Always be alert to ___________ conditions and practices. Notify supervision or a member of the safety _____________ of any unsafe condition and/or unsafe act immediately.
11. Know the location of the nearest __________ phone, fire ________________, fire exit, and know the facility ___________ procedure.
12. Report all injuries, regardless of how ___________, to your immediate supervisor and/or the ________ department.

The above safety rules and expectations apply to the Richmond Facility and are not all inclusive.

Activity: 4 - Reading Safety Guidelines (continued)

In addition to the key essential safety rules, the following safety guidelines also apply to the Richmond Facility:

1. Observe all **safety signs** and/or restrictions.
2. **Smoking** is only permitted in the following areas: cafeteria, lounges and offices where posted.
3. Only **qualified** operators are permitted to **operate** transporters, forklifts, etc., for their intended use.
4. High-heels, **clogs**, moccasins, sandals, and **open-toed** shoes are **prohibited** while at work. Safe, **non-skid** soles in good condition are **recommended** for all employees.
5. Report and/or clean up **spills** immediately to prevent falls. **Littering** is prohibited.
6. **Jewelry** may not be worn in **production** areas. The only exception is wedding bands.
7. Stop and check for **fork lifts** and other moving equipment prior to entering all walkways.
8. Broken/damaged **equipment** (stools, ladders, etc.) must not be used and must be reported to **supervision** at once for corrective action.
9. All "Safe **Operating** Procedures" (chemical handling, confined space entry, machine/equipment operation, etc.), as covered in a **training** class or as **posted**, must be followed.
10. Always be alert to **unsafe** conditions and practices. Notify supervision or a member of the safety **committee** of any unsafe condition and/or unsafe act immediately.
11. Know the location of the nearest **emergency** phone, fire **extinguisher**, fire exit, and know the facility **evacuation** procedure.
12. Report all injuries, regardless of how **minor**, to your immediate supervisor and/or the **medical** department.

The above safety rules and expectations apply to the Richmond Facility and are not all inclusive.

Activity: 5 - Reading Safety Rules

Richmond Bakery/Distribution Center Safety Rules and Expectations

The Richmond Facility makes every effort to provide you with working condi-tions that are pleasant and safe. However, you have a personal responsibility as well by following established safety rules and expectations in order to protect yourself and your co-workers from bodily injury. Neglect of your responsibility towards safety and violation of company safety rules cannot be allowed. This is the only way to make our facility a safer and healthier place to live.

The following are KEY ESSENTIAL Safety rules which must be strictly followed. Failure to do so will result in disciplinary action, up to and including discharge.

1. Safety devices and guards may not be removed or bypassed without proper authorization.
2. Compliance with Richmond's Lockout Program is expected of all employees.
3. No one shall at any time, without proper authorization, clean operating equipment within arm's length of any pinch point, conveyor roller or unguarded pulley, chain or sprocket.
4. Only authorized, trained personnel may operate machinery or mechanical equipment. No one shall activate powered equipment without confirming visually or audibly that no one is within arm's length of any moving machinery parts and that all existing guards are in place.
5. Personal protective equipment issued by the company must be worn at all times in areas or jobs where required.
6. No one shall work on or maintain any electrical panel, switch, light fixture, or outlet without de-energizing and locking and tagging out such equipment. No employee shall at any time work on electrical systems above 480V.
7. Air hoses are to be used only for equipment cleaning and not for personal cleaning.
8. No one shall work at heights above six (6) feet (except on a ladder) without some sort of fall restraint.

Activity: 5 - Richmond Bakery Safety Rules - Part I

Objective(s):

1. Read and interpret safety rules.

Materials Required:
Safety Rules and Expectations Handout

Directions:

1. Read the safety handout on the opposite page.
2. Underline any words that you don't know and add those words to your word bank.
3. Ask for help on words that you do not recognize and cannot sound out by yourself.
4. The sentences below are a summary of the rules on the opposite page. Read them carefully.
5. Put the number of the rule by its summary below.
6. Turn this page and check your answers.

_______a. Don't work on electrical current that is more than 480V.
_______b. Be sure no one is close enough to touch any moving parts of a machine before turning the machine on.
_______c. Don't climb higher than six (6) feet above the floor without a railing around you unless you're on a ladder.
_______d. Use air hoses only to clean equipment; not to clean you.
_______e. Get approval to take safety guards off.
_______f. Only approved employees may use machinery.
_______g. Get approval to clean equipment that is within arm's length to a pinch point, conveyor roller or unguarded pulley, chain or sprocket.
_______h. Know and keep the lockout rules.
_______i. Always use your safety equipment while on the job.

Activity 5: Answers

a-6, b-4, c-8, d-7, e-1, f-4, g-3, h-2, i-5

Activity: 6 - Reading to Interpret Richmond Bakery Safety Rules - Part 1

Objective(s):

1. Read and interpret safety rules.
2. Summarize safety rules in the form of a sign.
3. Assign an appropriate color to each safety sign.

Materials Required:

1. Completed Activity 5 materials
2. Blank signs
3. Sign words

Directions:

1. Read the signs on the opposite page.

2. Review the bakery safety rules from Activity 5.

Activity: 6 - Reading to Interpret Richmond Bakery Safety Rules - Part 2

Directions: (continued)

3. Use the blank spaces below to create a safety sign for each of the bakery rules.
4. Choose from the signs and words on the opposite page or use your own words.
5. Be sure the sign you make for each rule is a good summary of that rule.
6. After you make the signs, think about the best color for each sign to be. Write the name of the color on the sign.
7. Discuss with your group where you think the signs should be placed in the bakery. Refer to the rules.

Rule 1			Rule 6
Rule 2			Rule 7
Rule 3			Rule 8
Rule 4			Bonus Rule ☺
Rule 5			Bonus Rule☺

Actvity: 6 - Reading to Interpret Richmond Bakery Safety Rules - Part 2 - Signs

HOLD	CAUTION RESTRAINT NEEDED	AUTHORIZED PERSONNEL ONLY
THINK	STOP HIGH VOLTAGE - 480V	HIGH VOLTAGE
DANGER	STOP ! VOLTAGE > 480V	DO NOT ENTER
KEEP OUT	OBEY LOCKOUT	LOOK OUT FOR TRUCKS
LUNCH BREAK	AUTHORIZED USE ONLY	HANDLE WITH CARE
MACHINE #	APPROVED CLEANING ONLY	LOAD LIMITS ________LBS.
MISSION	NO SMOKING	RETURN TO STORAGE
TARE 575	REJECTED	CAUTION - HIGH VOLTAGE
FRAGILE	STAY AWAY - MOVING PARTS	EQUIPMENT USE ONLY
FIRE EXIT	KEEP HANDS CLEAR	SAFETY GEAR REQUIRED
DANGER - HOT	QUALITY FIRST	STOP - LOOK - LISTEN •ON
DO NOT SHIP	NO. ________ SHIPPERS	DO NOT REMOVE
DO NOT USE	KEEP GUARD IN PLACE	STOP HIGH VOLTAGE LOCKOUT

BLUE

Activity - Oreo Story

Objective - To have participants practice reading comprehension skills.

Directions - 1. Read the newspaper article on the next page.

2. Answer the following questions about the article.

True or False

_________ 1. The most popular way to eat Oreos is with milk.

_________ 2. The second most popular way to eat Oreos is with coffee.

_________ 3. Generally, most women prefer to twist their Oreos while most of the dunkers are men.

_________ 4. Many Oreos eaters eat the cookies with peanut butter.

_________ 5. A majority of people who twist their Oreos eat the frosted side first.

_________ 6. After twisting, dumking and nibbling Oreos, the other most popular way to eat Oreos is whole.

_________ 7. Fewer than 100,000 people participated in this survey.

_________ 8. The people who participated in this survey filled out a post card and sent it in.

_________ 9. Which of the graphs on the following page best illustrates the way Americans prefer to eat their Oreos. (Put the letter in the blank.)

Callers tell of twisting, dunking, nibbling Oreos

By Karen Shideler
KNIGHT-RIDDER NEWSPAPERS

DO WE KNOW how to eat our Oreos or what?

Well, OK, a third of us know you're supposed to twist.

Hey, it's a fact.

More than 174,000 people called a toll-free telephone number to register their opinions on the way to eat Oreos, obviously making the poll highly scientific. "Plus or minus some decimal point," agreed John Barrows, who is on the Nabisco public relations team. "Pinpoint accuracy."

Those who called were asked to choose among twisting, dunking, nibbling or "other." If they chose "other," their comments were recorded. Some, you don't want to know about (Oreos and horseradish).

"We discovered that Americans as a whole prefer to twist by 35 percent, followed by dunking at 30 percent. Nibbling came in last at 16 percent. And 'other' methods actually came in third at 19 percent," Barrows said.

Women twist; men dunk. Except in El Paso, Texas, and Springfield, Mo., where it's the other way around. "We don't know what to make of that," Barrows said.

In Chicago, they dunk. And "every significant city in Pennsylvania registers as a dunking city."

The nibblers are Norfolk; Oklahoma City; Savannah, Ga.; and Kingsport-Johnson City, Tenn.

Denver and Salt Lake City are among the places people prefer those "other" methods.

In the informal poll, dunking was the second-most popular method of eating Oreos.

"The most popular 'other' was probably eating them whole. One pop," Barrows said.

And lots of people have to have their Oreos with something, Barrows found in reading the 28,000 transcribed "other" replies. "Of course, the No. 1 combination obviously was Oreos and milk." Obviously. The second most popular was Oreos and peanut butter.

Peanut butter?

"That's what I said, and I never in a million years would have tried it," said Barrows, who – in the name of job dedication – did. "And you know, it's actually quite good."

In Chicago, they dunk. The nibblers are Norfolk; Oklahoma City; Savannah, Ga.; and Kingsport-Johnson City, Tenn.

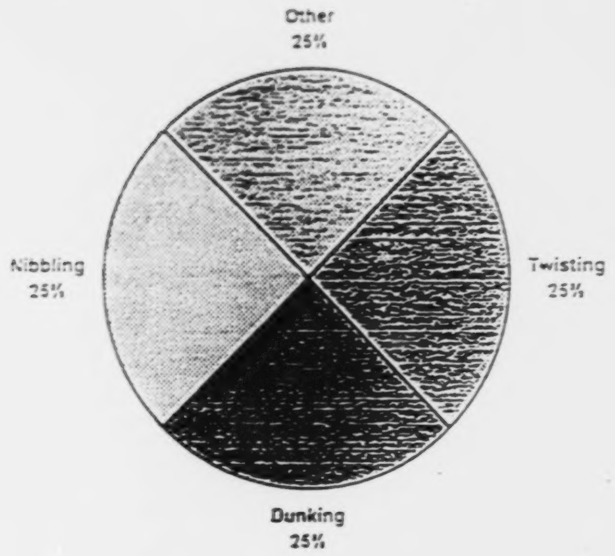
The peanut butter group fell into two subspecies: Those who use the Oreo like a chip and the peanut butter like a dip, and those who crack open the cookie, spread a precise amount on one side and put the cookie back together.

Also among the other combinations: Oreos with salsa. Oreos with beer. Oreos with coffee. And the aforementioned horseradish. "I think we had a list of 60 different things. . . . And no, I haven't tried hardly any of them." Barrows eats his Oreos "the good, old-fashioned way: three bites. Three even bites. No twisting, no dunking."

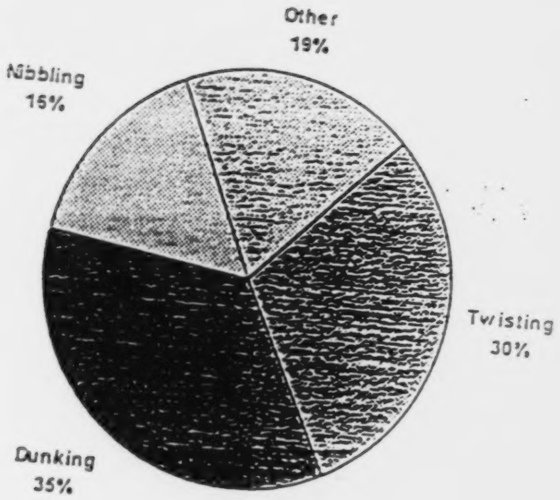
Nabisco didn't bother to ask twisters which side of the cookie should be eaten first – the plain side or the frosting side. "We figured this was enough information to compile this year," Barrows said. "We are thinking about doing further study next year."

BEST COPY AVAILABLE

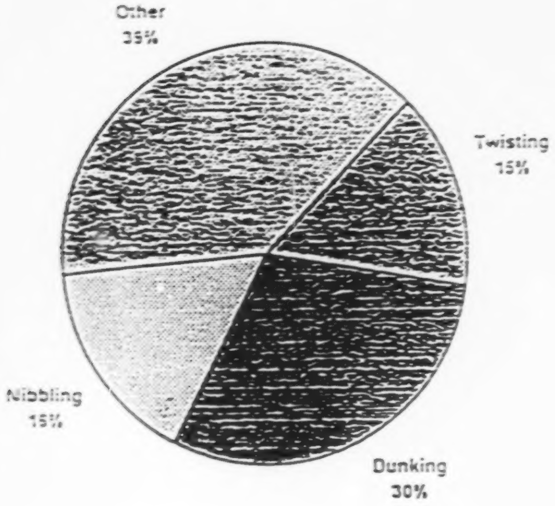
A.


Other
25%
Twisting
25%
Dunking
25%
Nibbling
25%

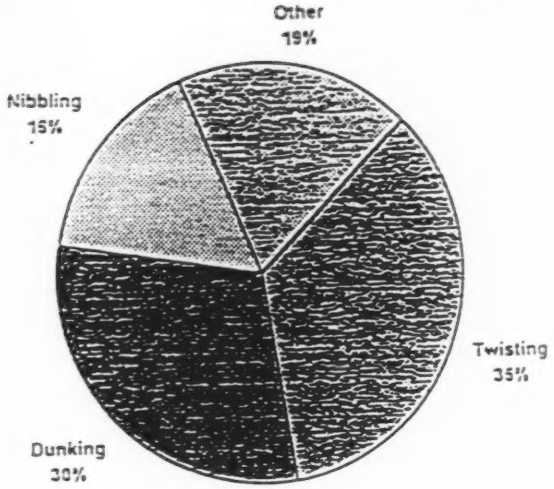
B.


Other
19%
Nibbling
15%
Twisting
30%
Dunking
35%

C.


Other
35%
Twisting
15%
Nibbling
15%
Dunking
30%

D.


Other
19%
Nibbling
15%
Twisting
35%
Dunking
30%

PINK

Reading Comprehension - Reading MSDS

Activity 1- Becoming Familiar with a Material Data Safety Sheet (MSDS)

Objective (s): This activity will enable participants

1. To understand the importance of a MSDS sheet.
2. To become familiar with a MSDS sheet.

Material Needed: pencil

Directions: Read the paragraph below. Think about the information you are reading. Consider what important points are presented. Then answer the questions. You may refer back to the paragraph, if you missed some details in reading.

Material Data Sheets are Important

In some work environments it is necessary for employees to handle or use hazardous chemicals. For example, at Nabisco the Environmental Health & Safety Department's Sanitation and Utility Technicians use various chemicals to sanitize areas and equipment. To succeed in doing a good and safe job, the technicians must understand how to use chemicals in a safe way. That's why the hazardous chemicals have their very own Material Safety Data Sheet (MSDS). MSDS are very important to Nabisco employees because they provide written information (or data) about how to use, handle, and store the chemical safely. Each MSDS may look a little different, but they all give the same basic information. If a sanitation employee has questions about a MSDS sheet, he/she should ask a supervisor. The sheet has the following sections:

1. Chemical Identification
2. Hazardous Ingredients
3. Physical Data
4. Fire & Explosion Data
5. Health Hazards
6. Reactivity Data
7. Spill or Leak Procedures
8. Special Protection
9. Special Precautions

Questions: Please fill in the blank or check the correct answer.

1. After reading the paragraph, what is your definition of a MSDS sheet?____

2. What are the major sections of a MSDS sheet?____________________
____
____

3. Why are MSDS sheets important?______________________________
____
____

4. If an employee has a question about a MSDS sheet, who should he/she ask?____

5. Why do you think it is important to read a MSDS sheet?
____

6. Every hazardous chemical used at Nabisco has a MSDS sheet that is organized in the same way? True____ False____

7. The MSDS sheet tells you how to use________, __________ and ___________the chemical safely.

8. What can you find out by reading a MSDS Sheet?________________
____

9. Most MSDS sheets have nine basic sections of information. True____ False____

Activity 2 - Understanding the Contents of the MSDS Sheets

Objective (s): This activity will enable participants

1. The become familiar with the contents of MSDS.

2. To understand how most material data sheets are organized.

Materials Needed: MSDS sheet contents handout, MSDS with missing section names, pencils

Directions: Read the handout about the sections of a MSDS sheet. Notice the names of the sections in **BOLD face type**.

Contents of a Material Safety Data Sheet

The MSDS for each hazardous chemical in your work area tells you how to use, handle, and store the chemical safely. Each MSDS may look a little different, but all give you the same basic information. Read the information below to learn more about what's included in the different sections of a MSDS sheet. If you have any specific questions, you can check with your supervisor.

Chemical Identification. The first section of the MSDS helps you identify the chemical. It lists the name of the chemical, any trade names, and the chemical manufacturer's name and address. This section may also list an emergency telephone number.

Hazardous ingredients. This section lists what's in the chemical that can harm you. It also lists the concentration of the chemical to which you an safely be exposed, often listed as the ***permissible exposure limit (PEL)*** or the *threshold limit value (TLV)*. These safe exposure limits are usually figured for average exposures over a typical work shift.

Physical Data. This section describes the chemical's appearance, odor, and other characteristics, ***percent volatile***, for instance, is how much of the chemical evaporates at room temperature. It can be harmful if inhaled. Respiratory protection or extra ventilation may be needed.

Contents of a Material Safety Data Sheet

Fire & Explosion Data. Here you can find at what temperature the chemical ignites called the ***flash point***. If a chemical is **flammable**, it ignites below 100°F. If it's ***combustible*** it ignites at 100°F or above. This section also lists **extinguishing media** - what will put out the fire safely- such as water spray, foam, or other type fire extinguisher.

Health Hazards. This section lists symptoms of overexposure, such as skin rash, burn, headache, or dizziness. It also tells you first aid and emergency procedures in case of overexposure, such as flushing your exposed skin running water for 15 minutes. It may also list any medical conditions that can be aggravated by exposure to the chemical.

Reactivity Data. Here you'll find whether the chemical "reacts" with materials or conditions. ***Incompatibility*** lists the materials, such as water or other chemicals, that cause the chemical to burn, explode, or release dangerous gases. ***Instability*** lists the environmental conditions, such as heat or direct sunlight, that cause a dangerous reaction.

Spill or Leak Procedures. This section tells you what to use to clean up an accidental spill or leak. No matter what the chemical is, always notify your supervisor right away. Before cleaning up a chemical spill, you may need to wear respiratory protection, gloves, safety goggles, or protective clothing. This section may also include notes on how to dispose of the chemical safely.

Special Protection. Here you'll find a listing of any personal protective equipment (respiratory protection, gloves, eye protection) you need to work safely with the chemical. If protective equipment is needed, this section may list the specific types that are recommended, such as full-face mask respirator, rubber gloves, and chemical safety goggles.

Special Precautions. This section lists any other special precautions to follow when handling the chemical. This may include what to have nearby to clean up a spill or put out a fire, and what safety signs to post near the chemical. This section also lists any other health and safety information not covered in other parts of the MSDS.

Activity 3 - Identifying & Understanding the Contents of a MSDS Sheet

Objective (s): This activity will enable particpants

1. To become familiar with the contents of a MSDS.

2. To understand how most material data sheets are organized.

Material Needed: Sheets with missing section names, pencils

Directions: Use the handout you just READ from Activity 2 about the contents of MSDS sheets. Now, fill in the missing section names on the MSDS sheets provided.

H&R

Haarmann & Reim
A MILES INC. COMPANY
70 Diamond Road
Springfield, New Jersey 07

Material Safety Data Sheet

In Case of Emergency Call:
CHEMTREC (800) 424-9300
For Other Information Call: (800) 422-1559

PAGE 1

Hazard Present:
Health: 1
Flammability: 0
Reactivity: 0

Hazard
0 = Insign
1 = Sligh
2 = Moder
3 = Seriou
4 = Sever

I.

A. PRODUCT NAME : 263792 DARITEEN NCF-247M(COLORED)

B. CHEMICAL NAME : ENZYME MODIFIED CHEDDAR CHEESE (PROCESSED CHEESE TY

C. CLASSIFICATION : FLAVOR MATERIAL

D. CAS NO. : NA

II.

A. FLASH POINT (CC / DEG F) : NF

B. EXTINGUISHING MEDIA : (Y) H2O FOG; (Y) FOAM; (Y) CO2; (Y) DRY CHEMI

C. SPECIAL PROCEDURES/UNUSUAL HAZARDS : USE SELF CONTAINED BREATHING APPARATUS. FIRE WILL GENERATE CO, CO2, AND SMOKE.

D. STABILITY : STABLE UNDER NORMAL CONDITIONS OF STORAGE AND USE.

E. CONDITIONS/MATERIALS TO AVOID : AVOID CONTACT WITH STRONG OXIDIZING AGENTS.

F. HAZARDOUS POLYMERIZATION POTENTIAL : NONE.

III.

A. EYE : SAFETY GLASSES

B. SKIN : OIL/SOLVENT RESISTENT GLOVES.

C. RESPIRATORY : RESPIRATORY : NOT REQUIRED

D. OTHER : USE IN A WELL VENTILATED AREA.

E. EXPOSURE LIMITS : NOT ESTABLISHED.

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H&R

Haarmann & Rei
A MILES INC. COMPAN
70 Diamond Road
Springfield, New Jersey

Material Safety Data Sheet

In Case of Emergency Call:
CHEMTREC (800) 424-9300
For Other Information Call: (800) 422-1559

PRODUCT : 263092

PAGE : 2

Hazard Present:	Hazar
Health: 1	0 = Ins
Flammability: 0	1 = Slig
Reactivity: 0	2 = Mod
	3 = Ser
	4 = Sev

IV.

A. INHALATION EXPOSURE : REMOVE TO FRESH AIR.

B. EYE CONTACT : FLUSH WITH WATER FOR 15 MINUTES. CONSULT PHYSICIAN IRRITATION CONTINUES.

C. SKIN CONTACT : WASH WITH SOAP AND WATER.

D. OTHER : NONE.

V.

A. INGREDIENTS(S) POSING HAZARD : NOT APPLICABLE.

B. ROUTE OF EXPOSURE AND EFFECTS OF OVEREXPOSURE : PROLONGED OR REPEA CONTACT MAY CAUSE SKIN IRRITATION. MAY CAUSE EYE IRRITATION.

VI.

A. APPEARANCE AND ODOR : CREAM COLORED PASTE

B. PHYSICAL PROPERTIES : NF

VII.

A. SPILLS AND LEAKS : COLLECT ONTO INERT ABSORBENT. PLACE INTO A SUITABLE CONTAINER.

B. DISPOSAL : DISPOSE OF IN ACCORDANCE WITH LOCAL REGULATIONS.

VIII.

KEEP CONTAINERS TIGHTLY CLOSED, STORE IN A COOL DRY AREA AWAY FROM HEAT AND DIRECT SUNLIGHT.

BEST COPY AVAILABLE

Material Safety Data Sheet

May be used to comply with
OSHA's Hazard Communication Standard,
29 CFR 1910.1200. Standard must be
consulted for specific requirements.

U.S. Department of Labor
Occupational Safety and Health Administration
(Non-Mandatory Form)
Form Approved
OMB No. 1218-0072

IDENTITY (As Used on Label and List)

Note: Blank spaces are not permitted. If any item is not applicable, or no information is available, the space must be marked to indicate that.

Section I

Manufacturer's Name AJINOMOTO CO., INC.	Emergency Telephone Number NJ OFFICE : 201-488-1212
Address (Number, Street, City, State, and ZIP Code) TOKYO, JAPAN	Telephone Number for Information NJ OFFICE : 201-488-1212
	Date Prepared 3-28-91
	Signature of Preparer (optional)

Section II —

Hazardous Components (Specific Chemical Identity; Common Name(s))	OSHA PEL	ACGIH TLV	Other Limits Recommended	% (optional)
MONOSODIUM L-GLUTAMATE MONOHYDRATE				
(MONOSODIUM GLUTAMATE)				

Section III — Physical/Chemical Characteristics

Boiling Point	SOLID	Specific Gravity (H_2O = 1)	1.62
Vapor Pressure (mm Hg.)	28.1@25°	Melting Point	450 F 232 C
Vapor Density (AIR = 1)	N/A	Evaporation Rate (Butyl Acetate = 1)	NONE

Solubility in Water
17g/100g H_2O at 25°C

Appearance and Odor
WHITE OR ALMOST WHITE NEEDLES OR POWDER WITH A SLIGHT PEPTONE ODOR

Section IV —

Flash Point (Method Used) NOT ESTABLISHED	Flammable Limits NON-FLAMMABLE	LEL	UEL

Extinguishing Media
IF INVOLVED IN FIRE, WATER OR CO_2 MAY BE USED

Special Fire Fighting Procedures
NONE SPECIAL, NONE NORMALLY REQUIRED

Unusual Fire and Explosion Hazards

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Section V —

Stability	Unstable		Conditions to Avoid
	Stable X		DECOMPOSES AT TEMPERATURES ABOVE 375°

Incompatibility (Materials to Avoid) NONE REPORTED

Hazardous Decomposition or Byproducts NONE

Hazardous Polymerization	May Occur		Conditions to Avoid
	Will Not Occur	X	NONE

Section VI —

Route(s) of Entry: Inhalation? Skin? Ingestion? X

Health Hazards (Acute and Chronic)

GENERALLY RECOGNIZED AS SAFE

Carcinogenicity: NTP? IARC Monographs? OSHA Regulated? NO

Signs and Symptoms of Exposure

NONE. EXCESSIVE CONTACT MAY CAUSE EYE IRRITATION.

Medical Conditions
Generally Aggravated by Exposure

NONE

Emergency and First Aid Procedures NON-TOXIC SUBSTANCE. FLUSH EYE WITH PLENTY OF WATER--- AND GET MEDICAL ATTENTION IF LARGE AMOUNT IS INGESTED.

Section VII —

Steps to Be Taken in Case Material Is Released or Spilled

ORDINARY. NO HAZARD RESULTS FROM SPILLAGE.

Waste Disposal Method SWEEP UP AND PLACE IN SUITABLE CLEAN, DRY CONTAINERS FOR RECLAMATION OR LATER DISPOSAL. DO NOT FLUSH INTO SEWER.

Precautions to Be Taken in Handling and Storing

STORE UNDER NORMAL CONDITIONS OF TEMPERATURE AND HUMIDITY IN CLOSED CONTAINERS.

Other Precautions

Section VIII —

Respiratory Protection (Specify Type) UNNECESSARY OR APPROVED NUISANCE MASK.

Ventilation	Local Exhaust DUST EXHAUST SYSTEM	Special
ORDINARY	Mechanical (General)	Other

Protective Gloves UNECESSARY, NOT REQUIRED | Eye Protection NON_SPECIFY (CHEM. GOGGLE

Other Protective Clothing or Equipment NONE

Work/Hygienic Practices NONE

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Activity 4 - Becoming Familiar with the Contents of a MSDS Sheets

Objective (s): This activity will enable participants

1. To practice reading different MSDS Sheets.

2. To practice indentifying the sections of the MSDS Sheets.

Materials Needed: MSDS sheets, color highlighters

Directions: Read through the MSDS sheets provided. Pay close attention to the section names. Use different color highlighters to mark the sections of the sheet as directed by the chart below. You may recognize two of the sheets from Activity 3. However, this time all of the section names are on the sheets.

MSDS Sheet Section	Highlighter Color
1. Chemical Identification	Red
2. Hazardous Ingredients	Green
3. Physical Data	Blue
4. Fire & Explosion Data	Red
5. Health Hazards	Green
6. Reactivity Data	Blue
7. Spill or Leak Procedures	Red
8. Special Protection	Green
9. Special Precautions	Blue

Material Safety Data Sheet

H&R
Haarmann & Reimer
A MILES INC. COMPANY
70 Diamond Road
Springfield, New Jersey 0708

In Case of Emergency Call:
CHEMTREC (800) 424-9300
For Other Information Call: (800) 422-1559

PAGE 1

Hazard Present
Health: 1
Flammability: 0
Reactivity: 0

Hazard Ra
0 = Insignific
1 = Slight
2 = Moderat
3 = Serious
4 = Severe

I. IDENTIFICATION

A. PRODUCT NAME : 263092 DARITEEN NCF-247M(COLORED)

B. CHEMICAL NAME : ENZYME MODIFIED CHEDDAR CHEESE (PROCESSED CHEESE TYP

C. CLASSIFICATION : FLAVOR MATERIAL

D. CAS NO. : NA

II. FIRE, EXPLOSION, AND REACTIVITY DATA

A. FLASH POINT (CC / DEG F) : NF

B. EXTINGUISHING MEDIA : (Y) H2O FOG; (Y) FOAM; (Y) CO2; (Y) DRY CHEMIC

C. SPECIAL PROCEDURES/UNUSUAL HAZARDS : USE SELF CONTAINED BREATHING APPARATUS. FIRE WILL GENERATE CO, CO2, AND SMOKE.

D. STABILITY : STABLE UNDER NORMAL CONDITIONS OF STORAGE AND USE.

E. CONDITIONS/MATERIALS TO AVOID : AVOID CONTACT WITH STRONG OXIDIZING AGENTS.

F. HAZARDOUS POLYMERIZATION POTENTIAL : NONE.

III. PROTECTION INFORMATION AND EQUIPMENT

A. EYE : SAFETY GLASSES

B. SKIN : OIL/SOLVENT RESISTENT GLOVES.

C. RESPIRATORY : RESPIRATORY : NOT REQUIRED

D. OTHER : USE IN A WELL VENTILATED AREA.

E. EXPOSURE LIMITS : NOT ESTABLISHED.

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H&R

Haarmann & Reimer
A MILES INC. COMPANY
70 Diamond Road
Springfield, New Jersey 07081

Material Safety Data Sheet

In Case of Emergency Call:
CHEMTREC (800) 424-9300
For Other Information Call: (800) 422-1559

PAGE : 2

PRODUCT : 263092

Hazard Present
Health: 1
Flammability: 0
Reactivity: 0

Hazard Ra
0 = Insignific
1 = Slight
2 = Moderat
3 = Serious
4 = Severe

IV. EMERGENCY FIRST AID

A. INHALATION EXPOSURE : REMOVE TO FRESH AIR.

B. EYE CONTACT : FLUSH WITH WATER FOR 15 MINUTES. CONSULT PHYSICIAN IF IRRITATION CONTINUES.

C. SKIN CONTACT : WASH WITH SOAP AND WATER.

D. OTHER : NONE.

V. HEALTH HAZARD DATA

A. INGREDIENTS(S) POSING HAZARD : NOT APPLICABLE.

B. ROUTE OF EXPOSURE AND EFFECTS OF OVEREXPOSURE : PROLONGED OR REPEATE CONTACT MAY CAUSE SKIN IRRITATION. MAY CAUSE EYE IRRITATION.

VI. PHYSICAL DATA

A. APPEARANCE AND ODOR : CREAM COLORED PASTE

B. PHYSICAL PROPERTIES : NF

VII. SPILL, LEAK, AND DISPOSAL PROCEDURES

A. SPILLS AND LEAKS : COLLECT ONTO INERT ABSORBENT. PLACE INTO A SUITABLE CONTAINER.

B. DISPOSAL : DISPOSE OF IN ACCORDANCE WITH LOCAL REGULATIONS.

VIII. HANDLING AND STORAGE PROCEDURES

KEEP CONTAINERS TIGHTLY CLOSED, STORE IN A COOL DRY AREA AWAY FROM HEAT AND DIRECT SUNLIGHT.

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H&R

Haarmann & Reimer C
A MILES INC. COMPANY
70 Diamond Road
Springfield, New Jersey 07081

Material Safety Data Sheet

In Case of Emergency Call:
CHEMTREC (800) 424-9300
For Other Information Call: (800) 422-1559

PRODUCT : 253092

PAGE : 3

Hazard Present
Health: 1
Flammability: 0
Reactivity: 0

Hazard Rati
0 = Insignificar
1 = Slight
2 = Moderate
3 = Serious
4 = Severe

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THIS INFORMATION IS ACCURATE TO THE BEST KNOWLEDGE OF HAARMANN & REIMER CORPORATION. IT IS THE USER'S RESPONSIBILITY TO DETERMINE SAFE CONDITI FOR USE OF THIS PRODUCT.

Material Safety Data Sheet

May be used to comply with
OSHA's Hazard Communication Standard,
29 CFR 1910.1200. Standard must be
consulted for specific requirements.

U.S. Department of Labor
Occupational Safety and Health Administration
(Non-Mandatory Form)
Form Approved
OMB No. 1218-0072

IDENTITY *(As Used on Label and List)*

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Emergency Telephone Number: NJ OFFICE : 201-488-1212

Address *(Number, Street, City, State, and ZIP Code)*: TOKYO, JAPAN

Telephone Number for Information: NJ OFFICE : 201-488-1212

Date Prepared: 3-28-91

Signature of Preparer *(optional)*

Section II — Hazardous Ingredients/Identity Information

Hazardous Components (Specific Chemical Identity; Common Name(s))	OSHA PEL	ACGIH TLV	Other Limits Recommended	% (optional)
MONOSODIUM L-GLUTAMATE MONOHYDRATE (MONOSODIUM GLUTAMATE)				

Section III — Physical/Chemical Characteristics

Boiling Point	SOLID	Specific Gravity (H_2O = 1)	1.62
Vapor Pressure (mm Hg.)	28.1@25°	Melting Point	450°F 232°C
Vapor Density (AIR = 1)	N/A	Evaporation Rate (Butyl Acetate = 1)	NONE

Solubility in Water: 17g/100g H_2O at 25°C

Appearance and Odor: WHITE OR ALMOST WHITE NEEDLES OR POWDER WITH A SLIGHT PEPTONE ODOR

Section IV — Fire and Explosion Hazard Data

Flash Point (Method Used)	Flammable Limits	LEL	UEL
NOT ESTABLISHED	NON-FLAMMABLE		

Extinguishing Media: IF INVOLVED IN FIRE, WATER OR CO_2 MAY BE USED

Special Fire Fighting Procedures: NONE SPECIAL, NONE NORMALLY REQUIRED

Unusual Fire and Explosion Hazards: NONE REPORTED

Section V — Reactivity Data

Stability	Unstable		Conditions to Avoid
	Stable	X	DECOMPOSES AT TEMPERATURES ABOVE 375°

Incompatibility (Materials to Avoid) NONE REPORTED

Hazardous Decomposition or Byproducts NONE

Hazardous Polymerization	May Occur		Conditions to Avoid
	Will Not Occur	X	NONE

Section VI — Health Hazard Data

Route(s) of Entry: Inhalation? Skin? Ingestion? X

Health Hazards (Acute and Chronic)

GENERALLY RECOGNIZED AS SAFE

Carcinogenicity: NTP? IARC Monographs? OSHA Regulated? NO

Signs and Symptoms of Exposure

NONE. EXCESSIVE CONTACT MAY CAUSE EYE IRRITATION.

Medical Conditions Generally Aggravated by Exposure

NONE

Emergency and First Aid Procedures NON-TOXIC SUBSTANCE. FLUSH EYE WITH PLENTY OF WATER AND GET MEDICAL ATTENTION IF LARGE AMOUNT IS INGESTED.

Section VII — Precautions for Safe Handling and Use

Steps to Be Taken in Case Material Is Released or Spilled

ORDINARY. NO HAZARD RESULTS FROM SPILLAGE.

Waste Disposal Method

SWEEP UP AND PLACE IN SUITABLE CLEAN, DRY CONTAINERS FOR RECLAMATION OR LATER DISPOSAL. DO NOT FLUSH INTO SEWER.

Precautions to Be Taken in Handling and Storing

STORE UNDER NORMAL CONDITIONS OF TEMPERATURE AND HUMIDITY IN CLOSED CONTAINERS.

Other Precautions

Section VIII — Control Measures

Respiratory Protection (Specify Type)

UNNECESSARY OR APPROVED NUISANCE MASK

Ventilation	Local Exhaust DUST EXHAUST SYSTEM	Special
ORDINARY	Mechanical (General)	Other

Protective Gloves UNECESSARY, NOT REQUIRED

Eye Protection NON_SPECIFY (CHEM. GOGGLE

Other Protective Clothing or Equipment NONE

Work/Hygienic Practices NONE

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Material Safety Data Sheet
Required under USDL Safety and Health Regulations for Shipyard Employment (29 CFR 1915)

U.S. Department of Labor
Occupational Safety and Health Administration

[redacted]

OMB No. 1218-00
Expiration Date 05/31/

Section I

Manufacturer's Name: Lyoferm, Inc.

Emergency Telephone Numb: (317) 359-9573

Address (Number, Street, City, State, and ZIP Code):
3362 E. Washington St.
Indianapolis, IN 46201

Chemical Name and Synonyms:

Trade Name and Synonyms: "Sour Start" [redacted]

Chemical Family: Carbohydrate and Protein

Formula: Cultu

Section II - Hazardous Ingredients None

Paints, Preservatives, and Solvents	%	TLV (Units)	Alloys and Metallic Coatings	%	TLV (Units
Pigments			Base Metal		
Catalyst			Alloys		
Vehicle			Metallic Coatings		
Solvents			Filler Metal Plus Coating or Core Flux		
Additives			Others		
Others					

Hazardous Mixtures of Other Liquids, Solids or Gases

	%	TLV (Units)
N/A		

Section III - Physical Data

Boiling Point (°F) N/A		Specific Gravity (H_2O=1) N/A	
Vapor Pressure (mm Hg.) N/A		Percent Volatile by Volume (%) (% Moisture)	7%
Vapor Density (AIR=1) N/A		Evaporation Rate ________ =1)	

Solubility in Water: Complete

Appearance and Odor: Off-white powder with typical flour odor

Section IV - Fire and Explosion Hazard Data

Flash Point (Method Used): N/A

Flammable Limits: N/A | Lel | Uel

Extinguishing Media: Water, CO2, Dry chemical

Special Fire Fighting Procedures: N/A

Unusual Fire and Explosion Hazards: None

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SEP [illegible]

Section V - Health Hazard Data

Threshold Limit Value
N/A

Effects of Overexposure
N/A

Emergency First Aid Procedures
None relating to this product

Section VI - Reactivity Data

Stability	Unstable		Conditions to Avoid N/A
	Stable	x	

Incompatibility (Materials to Avoid)
N/A

Hazardous Decomposition Products
N/A

Hazardous Polymerization	May Occur		Conditions to Avoid N/A
	Will Not Occur	x	

Section VII - Spill or Leak Procedures

Steps to be Taken in Case Material is Released or Spilled

Wipe, sweep, vacuum

Waste Disposal Method
Normal dry waste disposal

Section VIII - Special Protection Information

Respiratory Protection (Specify Type)

Ventilation	Local Exhaust Not needed	Special
	Mechanical (General)	Other

Protective Gloves Not needed	Eye Protection Not needed

Other Protective Equipment

Section IX - Special Precautions

Precautions to be Taken in Handling and Storing
No special precautions

Other Precautions
N/A

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Activity 5 - Identifying the Contents of a Material Safety Data Sheet (MSDS)

Objective (s): This activity will enable particpants

1. To practice identifying the sections of MSDS Sheets.

Materials Needed: MSDS Sheets

Directions: Answer these questions noting what section of a MSDS Sheet you would find the information. Remember that most MSDS sheets have nine sections. Some information such as regulatory information or how to transport the mateiral maybe included in the special precautions or a separate section. Put the letter that corresponds to the correct section of the MSDS in the space provided.

a. Chemical Identification (General Information)
b. Hazardous Ingredients
c. Physical Data
d. Fire & Explosion Data
e. Health Hazards (Toxicity Information)
f. Reactivity Data
g. Spill or Leak Procedures
h. Special Protection
i. Special Precautions (Regulatory & Transport Information)

1._____What special protection should be worn when handling chemicals?

2._____How to clean up a chemical spill?

3._____What conditions may make a chemcical explode?

4._____Where and how to store a particular chemical?

5._____Is the chemical hazardous to may health?

6._____Who is the manufacturer of the chemical?

7.____What kind of a chemcial am I working with?

8.____What extra precautions should I take when handling a chemical?

9.____What other kind of name the chemical may be called on the market?

10.____What is the make-up or ingredients of a particular chemical?

Activity 6 - Working with MSDS Sheets

Objective (s): This activity will enable participants

1. To practice reading MSDS Sheets.

Materials Needed: Pencil, MSDS Sheet for Limonene, Sodium Chloride and Solution S0636, PA-2.

Directions: Read and MSDS sheets provided. Notice the names of the sections as you read these sheets. Then answer the questions below for each of the products below.

Limonene

1. What is the this product's boiling point?_____

2. In what section did you find the boiling point information?________
____

3. What precautions should be takens when handling and storing this product?____
____
____

4. What is the extinguishing media for this product?____________

5. In what section did you find information about theextinguishing media?____

Sodium Chloride

1. Is this product regulated under OSHA Hazard Communication Standard?________________________________

2. This product can be described as a white crystalline solid with slight halogen odor? Yes____ No_____

3. What kind of medical conditions can be aggravated by exposure to this product?____________________________

4. What steps should be taken if this product is released or spilled?____
____
____

5. Gloves, goggles, and protective clothing must be worn when handling this chemical? True____ False____

Solution S0636, PA,2

1. What is the precautionary label on this solution?_______________
____

2. Does this solution have color? Yes____ No____

3. This solution is regulated by OSHA. True____ False____

4. What is the spill control or recovery for this solution?______________
____

MATERIAL SAFETY DATA SHEET : FRESH FORCE PAGE : 01

(078480-0110P -30114133-1740)	DATE OF ISSUE 01/16/95	SUPERSEDES 12/08/94

SECTION I - GENERAL INFORMATION

CHEMICAL NAME & SYNONYMS N/A	TRADE NAME & SYNONYMS FRESH FORCE
CHEMICAL FAMILY ORANGE TERPENE SOLUTION	FORMULA X<--MIXTURE

MANUFACTURERS NAME:
MANTEK, DIVISION OF NCH CORP.

ADDRESS (NUMBER, STREET, CITY, STATE & ZIP CODE)
BOX 152170
IRVING, TEXAS 75015

PREPARED BY:	PRODUCT CODE NUMBER	EMERGENCY TELEPHONE NUMBER
C KERINS/CHEMIST	1740	214-438-1331

SECTION II- HAZARDOUS INGREDIENTS

THE HAZARDS PRESENTED BELOW ARE THOSE OF THE INDIVIDUAL COMPONENTS.

CHEMICAL NAME (INGREDIENTS) :
D-LIMONENE

HAZARD----->COMB/IRR. STEL(TWA)- ->N/E	TLV--->50 PPM CAS#--->5989-27-5	1.	PEL-->N/E 2.

CHEMICAL NAME (INGREDIENTS) :
HEXYLENE GLYCOL

HAZARD----->IRR. STEL(TWA)- ->N/E	TLV--->25 PPM CAS#--->107-41-5	1.	PEL-->N/E 2.

CHEMICAL NAME (INGREDIENTS) :
DIETHANOLAMINE SALT OF TALL OIL FATTY ACID

HAZARD----->IRR. STEL(TWA)- ->N/E	TLV--->N/E CAS#--->61790-66-7	1.	PEL-->N/E 2.

CHEMICAL NAME (INGREDIENTS) :
TRIETHANOLAMINE SALT OF TALL OIL FATTY ACID

HAZARD----->IRR. STEL(TWA)- ->N/E	TLV--->N/E CAS#--->68132-46-7	1.	PEL-->N/E 2.

FRESH FORCE

(CONTINUED) SECTION II- HAZARDOUS INGREDIENTS PAGE : 02

SECTION IIA - NON-HAZARDOUS INGREDIENTS

NON-HAZARDOUS INGREDIENT NAMES AND CAS NUMBERS ARE PROTECTED UNDER NJ TRADE SECRET REGISTRY # --409353-5009P

SECTION III - PHYSICAL DATA

BOILING PT.(FAHRENHEIT)	378:F	SPEC GRAVITY (H2O=1)	:0.95
VAPOR PRESSURE (MM HG).	5	COLOR	ORANGE
VAPOR DENSITY (AIR=1)	5	ODOR	ORANGE
PH @ 100%	@10%=8.5	CLARITY	TRANSPARENT
PERCENT VOLATILE BY VOLUME (%)	80	EVAPORATION RATE (BU AC = 1)	0.01
SOLUBILITY IN WATER	EMULSION		
VISCOSITY	SEMI-VISCOUS		

SECTION IV - FIRE AND EXPLOSION HAZARD

FLASH POINT (METHOD USED)	FLAMMABLE LIMITS	LEL	UEL
119:F T.C.C.	D-LIMONENE	0.7	6.1

EXTINGUISHING MEDIA
X<--FOAM X<--"ALCOHOL" FOAM X<--CO2 X<--DRY CHEMICAL <--WATER SPRAY <--OTHER

SPECIAL FIRE FIGHTING PROCEDURES
FIREFIGHERS SHOULD WEAR PROPER PROTECTIVE EQUIPEMENT AND SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE IN THE POSITIVE PRESSURE MODE.

UNUSUAL FIRE & EXPLOSION HAZARDS
BURNING MAY PRODUCE OXIDES OF CARBON,SULFUR,AND NITROGEN.VAPORS ARE HEAVIER THAN AIR AND MAY TRAVEL TO DISTANT IGNITION SOURCES AND FLASHBACK. DO NOT SPRAY A DIRECT STREAM OF WATER INTO PRODUCT AS FROTHING MAY OCCUR.

NFPA HAZARD RATING (0=INSIGNIFICANT:1=SLIGHT:2=MODERATE:3=HIGH:4=EXTREME):
1 <--HEALTH 2 <--FLAMMABILITY 0 <--REACTIVITY <--SPECIAL

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SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE :

NOT ESTABLISHED FOR MIXTURE. SEE SECTION II.

EFFECTS OF OVEREXPOSURE

- ACUTE - (SHORT TERM EXPOSURE)

<>EYE CONTACT: CAUSES IRRITATION, REDNESS, TEARING, SEVERE DISCOMFORT, AND POSSIBLE CORNEAL INJURY.<>

-SKIN CONTACT: MAY CAUSE IRRITATION SEEN AS REDNESS, ITCHING, AND SWELLING. MAY CAUSE AN ALLERGIC SKIN REACTION.-

* INGESTION: MAY CAUSE IRRITATION OF MOUTH AND THROAT, ABDOMINAL PAIN, NAUSEA, DIZZINESS, AND LOSS OF CONSCIOUSNESS. INGESTION AND SUBSEQUENT VOMITING OF THIS PRODUCT CAN LEAD TO ASPIRATION OF THE PRODUCT INTO THE LUNGS WHICH CAN LEAD CHEMICAL PHEUMONITIS AND MAY BE FATAL.

INHALATION: MAY CAUSE IRRITATION OF THE RESPIRATORY TRACT SEEN AS COUGHING AND SNEEZING. MAY CAUSE ALLERGIC REPIRATORY REACTION IF INHALED.

- CHRONIC - (LONG TERM EXPOSURE)

#MAY AGGRAVATE EXISTING SKIN AND RESPIRATORY CONDITIONS.#
*TARGET ORGANS: NONE KNOWN.
REPEATED EXPOSURE TO THIS PRODUCT MAY PRODUCE SKIN AND RESPIRATORY SENSITIZATION.

PRIMARY ROUTE OF ENTRY: <-- INHALATION <-- INGESTION X<-- ABSORPTION

EMERGENCY & FIRST AID PROCEDURES

INHALATION :
REMOVE FROM THE AREA TO FRESH AIR. SEEK MEDICAL ATTENTION IF RESPIRATORY IRRITATION DEVELOPS OR IF BREATHING BECOMES DIFFICULT.

EYE CONTACT:
IMMEDIATELY RINSE THE EYES WITH WATER. REMOVE ANY CONTACT LENSES AND CONTINUE FLUSHING FOR AT LEAST 15 MINUTES. HOLD THE EYELIDS APART TO ENSURE RINSING OF THE ENTIRE SURFACE OF THE EYES AND LIDS WITH WATER. GET IMMEDIATE MEDICAL ATTENTION.

SKIN CONTACT:
WASH AFFECTED AREAS WITH PLENTY OF SOAP AND WATER FOR SEVERAL MINUTES. REMOVE AND CLEAN CONTAMINATED CLOTHING AND SHOES. SEEK MEDICAL ATTENTION IF IRRITATION DEVELOPS.

INGESTION :
GIVE 3 TO 4 GLASSES OF WATER, BUT DO NOT INDUCE VOMITING. IF VOMITING OCCURS, GIVE FLUIDS AGAIN. GET IMMEDIATE MEDICAL ATTENTION IF DISCOMFORT -

NOTES TO PHYSICIAN :

SECTION VI - TOXICITY INFORMATION

PRODUCT CONTAINS CHEMICAL LISTED AS CARCINOGEN OR POTENTIAL CARCINOGEN BY:

IARC <--YES X<--NO	NTP <--YES X<--NO	OSHA <--YES X<--NO	ACGIH <--YES X<--NO	OTHER <--YES X<--NO

(CONTINUED) SECTION VI - TOXICITY INFORMATION

D-LIMONENE :
ORL-RAT LD50: 4400 MG/KG 3.
ORL-MUS LD50: 5500 MG/KG 3.
IPR-RAT LD50: 3600 MG/KG 3.
IVN-RAT LD50: 110 MG/KG 3.
DIETHANOLAMINE SALT OF TALL OIL FATTY ACID: NO DATA FOUND.
TRIETHANOLAMINE SALT OF TALL OIL FATTY ACID: NO DATA FOUND.
HEXYLENE GLYCOL:
SKN-RBT LD50: 8560 MG/KG 3.
ORL-RAT LD50: 3700 MG/KG 3.
IPR-RAT LDLO: 1500 MG/KG 3.
EYE-RBT 93 MG SEV 3.
SKN-RBT 500 MG/24H MODERATE 3.
SKN-RBT 465 MG OPEN MILD 3.

SECTION VII - REACTIVITY DATA

STABILITY	X<--STABLE <--UNSTABL	CONDITIONS TO AVOID
	AVOID HEAT, HOT SURFACES, SPARKS AND OPEN FLAMES.	

INCOMPATIBILITY (MATERIALS TO AVOID)
OXIDIZING AGENTS, REDUCING AGENTS, STRONG ACIDS AND BASES.
IODINE PENTSFLUOROETHYLENE CONTACT CAN BE EXPLOSIVE.

HAZARDOUS DECOMPOSITION PRODUCTS
OXIDES OF CARBON AND NITROGEN.

HAZARDOUS	WILL NOT MAY X <--OCCUR <--OCCUR	CONDITIONS TO AVOID
POLYMERIZATION	NONE KNOWN.	

SECTION VIII - SPILL OR LEAK PROCEDURES

STEPS TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
REMOVE ALL SOURCES OF IGNITION. DIKE AND CONTAIN SPILL. ABSORB WITH AN INERT MATERIAL AND SWEEP, SCOOP, OR SHOVEL MATERIAL INTO A PROPERLY LABELED CONTAINER FOR DISPOSAL. CAUTION: SPILL CAN MAKE FLOOR SLIPPERY.

WASTE DISPOSAL METHOD
DISPOSE OF IN ACCORDANCE WITH ALL FEDERAL, STATE AND LOCAL REGULATIONS.

NEUTRALIZING AGENT
NONE KNOWN.

SECTION IX - SPECIAL PROTECTION INFORMATICPAGE : 05

REQUIRED VENTILATION
GENERAL EXHAUST IS USUALLY ADEQUATE TO PREVENT AIRBORNE CONCENTRATIONS FROM EXCEEDING THE RECOMMENDED EXPOSURE LIMITS. IF THESE RECOMMENDED LIMITS ARE OR MAY BE EXCEEDED WHEN GENERAL EXHAUST IS USED, THEN LOCAL MECHANICAL EXHAUST WILL BE NECESSARY.

RESPIRATORY PROTECTION
A NIOSH/MSHA APPROVED RESPIRATOR IN POORLY VENTILATED AREAS AND/OR FOR EXPOSURE ABOVE THE ACGIH TLV OR OSHA PEL.

PROTECTIVE GLOVES
NEOPRENE FOR REPEATED OR PROLONGED CONTACT.

EYE PROTECTION
WEAR SAFETY GLASSES IF THE METHOD OF APPLICATION PRESENTS THE LIKELIHOOD OF EYE CONTACT.

OTHER PROTECTION
WEAR GENERAL DUTY WORK CLOTHING AND SHOES.
HAVE A SAFETY SHOWER AND EYE STATION IN WORK AREA

SECTION X - STORAGE AND HANDLING INFORMATION

STORAGE TEMPERATURE	INDOOR	HEATED	REFRIGERATED	OUTDOOR
100: F<--MAX 35: F<--MIN	X			

PRECAUTIONS TO BE TAKEN IN HANDLING & STORING
KEEP AWAY FROM HEAT AND FLAME.
KEEP CONTAINERS TIGHTLY CLOSED WHEN NOT IN USE.
ALL HANDLING EQUIPMENT AND DRUM SHOULD BE PROPERLY GROUNDED. DO NOT CUT WELD, BRAZE, OR SOLDER EVEN EMPTY CONTAINERS AS THEY MAY CONTAIN PRODUCT RESIDUE WHICH IS COMBUSTIBLE.

OTHER PRECAUTIONS
FOLLOW LABEL DIRECTIONS.
KEEP OUT OF REACH OF CHILDREN.
READ ENTIRE LABEL BEFORE USING PRODUCT.
AVOID EYE CONTACT AND EXCESSIVE BREATHING OF VAPORS.

SECTION XI - REGULATORY INFORMATION

CHEMICAL NAME	C.A.S. NUMBER	UPPER % LIMIT
N/A		

(CONTINUED) SECTION XI - REGULATORY INFORMATION

THOSE INGREDIENTS LISTED ABOVE ARE SUBJECT TO THE REPORTING REQUIREMENTS OF 313 OF TITLE III OF THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 AND 40 CFR PART 372.

IF UE (USE EXEMPTION) APPEARS UNDER UPPER % LIMIT, END USERS ARE EXEMPT FROM NOTIFICATION BECAUSE THE PRODUCT IS USED AND LABELED FOR ROUTINE JANITORIAL WORK, OR THE PRODUCT IS USED AND LABELED FOR FACILITY GROUNDS MAINTENANCE (SUCH AS FERTILIZERS AND HERBICIDES), OR THE PRODUCT IS USED AND LABELED FOR MAINTAINING MOTOR VEHICLES.

CALIFORNIA PROPOSITION 65

WARNING: THIS PRODUCT CONTAINS THE FOLLOWING CHEMICAL(S) KNOWN TO THE STATE OF CALIFORNIA TO CAUSE (1) CANCER OR (2) BIRTH DEFECTS OR OTHER REPRODUCTIVE HARM: NITRILOTRIACETIC ACID (1) AND ETHANOL (2) AS TRACE CONTAMINANTS.

SECTION XII - TRANSPORTATION - (FOR FUTURE USE)

APPLICABLE REGULATIONS
<--49 CFR <--IMCO <--TARIFF 6 D <--IATA <--MILITARY AIR (AFR 71-4)

SHIPPING NAME

HAZARD CLASS | ID NUMBER | REPORT QTY

LABELS | LIMITED QTY

UNIT CONTAINER

DOT SPS CONTAINER | NET EXPLOSIVE WT.

AEROSOL PROPELLANT(S)

SECTION XIII - REFERENCES

1. THRESHOLD LIMIT VALUES FOR CHEMICAL SUBSTANCES AND PHYSICAL AGENTS AND BIOLOGICAL EXPOSURE INDICES, ACGIH, 1994-1995.
2. OSHA PEL.
3. SAX'S DANGEROUS PROPERTIES OF INDUSTRIAL MATERIALS, 8TH EDITION, RICHARD J. LEWIS, SR.

*SHORT TERM EXPOSURE LIMIT (TWA) LISTED AS FINAL RULE LIMITS PUBLISHED IN THE FEDERAL REGISTER/VOL.54 NO.12, 1-19-89

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(CONTINUED) **SECTION XIII - REFERENCES**

THE INFORMATION CONTAINED HEREIN IS BASED ON DATA CONSIDERED ACCURATE IN LIGHT OF CURRENT FORMULATION. HOWEVER, NO WARRANTY IS EXPRESSED OR IMPLIED REGARDING THE ACCURACY OF THIS DATA OR THE RESULTS TO BE OBTAINED FROM THE USE THEREOF.

MANTEK, DIVISION OF NCH CORP. ASSUMES NO RESPONSIBILITY FOR PERSONAL INJURY OR PROPERTY DAMAGE CAUSED BY THE USE, STORAGE OR DISPOSAL OF THE PRODUCT IN A MANNER NOT RECOMMENDED ON THE PRODUCT LABEL. USERS ASSUME ALL RISKS ASSOCIATED WITH SUCH UNRECOMMENDED USE, STORAGE, OR DISPOSAL OF THE PRODUCT.

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CARGILL SALT

MATERIAL SAFETY DATA SHEET

I. GENERAL INFORMATION

TRADE NAME (COMMON NAME OR SYNONYM) Salt	C.A.S. NO(S) 7647-14-5

CHEMICAL NAME(S) Sodium Chloride	FORMULA NaCl	MOLECULAR WEIGHT 58.44

MANUFACTURER(S) NAME AND ADDRESS Cargill Incorporated - Salt Division P.O. Box 5621 Minneapolis, MN 55440	GSA National Stock Number (General Services Admin.) 6810-00-227-0437

CONTACT Director-Quality Admin.	PHONE NO. (612) 742-6581	DATE ISSUED 3/1/85	DATE REVISED 4/28/93

II. HAZARDOUS INGREDIENTS/IDENTITY INFORMATION

Hazardous Components (Specific Chemical Identity; and/or Common Name(s))	OSHA PEL	ACGIH TLV	Other Limits Recommended	Percent (Optional)
None				

THIS PRODUCT IS NOT REGULATED UNDER:
- OSHA Hazard Communication Standard 29 CFR 1910.1200
- S.A.R.A. Title III

III. PHYSICAL/CHEMICAL CHARACTERISTICS

BOILING POINT (760mm Hg) (°C)	1465	SPECIFIC GRAVITY (H_2O=1)	2.16
VAPOR PRESSURE (mm Hg/747°C)	2.4	MELTING POINT (°C)	801
VAPOR DENSITY (Air=1)	NA	EVAPORATION RATE (Butyl Acetate=1)	NA
SOLUBILITY IN WATER (g/cc,%)	26.4		

APPEARANCE AND ODOR White crystalline solid with slight halogen odor.

SALT-326 (REV. 4/93)

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IV. FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used) Not Applicable.	FLAMMABLE LIMITS LEL NA	 UEL NA

EXTINGUISHING MEDIA
Not Applicable. This product is nonflammable.

SPECIAL FIRE-FIGHTING PROCEDURES/EQUIPMENT
Not Applicable.

UNUSUAL FIRE AND EXPLOSION HAZARDS
None

V. REACTIVITY DATA

STABILITY		
Stable	X	Conditions To Avoid: Contact with strong acids.
Unstable		

INCOMPATABILITY (Materials to Avoid)
Becomes corrosive to metals when wet.

HAZARDOUS DECOMPOSITION OR BYPRODUCTS:
May evolve chlorine gas when in contact with strong acids.

HAZARDOUS POLYMERIZATION		
May Occur		Conditions To Avoid: Not Applicable.
Will Not Occur	X	

VI. HEALTH HAZARD DATA

ROUTE(S) OF ENTRY

Inhalation? May cause mild irritation of nose and throat.

Skin? Dust may cause mild irritation.

Ingestion? Ingestion of large amounts may cause gastrointestinal upset.

HEALTH HAZARDS (Acute And Chronic)
Ingestion of large amounts (greater than 0.1 pound) can cause gastrointestinal upset and irritation of the stomach.
No applicable information found for chronic systemic effects.

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VI. HEALTH HAZARD DATA (Continued)

CARCINOGENICITY

NTP? Not listed as a carcinogen or mutagen.

IARC Monographs? Not listed as a carcinogen or mutagen.

OSHA Regulated? Not listed as a carcinogen or mutagen.

SIGNS AND SYMPTOMS OF EXPOSURE

Inhalation: Slight irritation of the nose; sneezing.

Skin Contact: Irritation; inflammation.

Ingestion: Nausea; vomiting.

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE

In some cases of confirmed hypertension, ingestion may result in elevated blood pressure. (This applies only to salt-sensitive individuals.)

EMERGENCY AND FIRST AID PROCEDURES

Inhalation: If person breathes large quantities, remove to fresh air at once. If breathing stops, apply artificial respiration immediately.

Skin Contact: Remove clothing from affected area. Wash skin thoroughly. Rinse carefully. For eye contact, flush with water immediately, lifting eyelids occasionally.

Ingestion: Less than a few grams would not be harmful. For larger quantities, drink large amounts of water or milk.

EMERGENCY TELEPHONE NUMBERS Daytime (612) 742-6581
Evenings (612) 476-1127

VII. PRECAUTIONS FOR SAFE HANDLING AND USE

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
Contain spills to prevent contamination of water supply or sanitary sewer system. Vacuum or sweep into containers for proper disposal.

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VII. PRECAUTIONS FOR SAFE HANDLING AND USE (Continued)

WASTE DISPOSAL METHOD
For disposal of this material as a waste, act in accordance with all applicable Federal, state, and local waste management regulations.

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE
Avoid humid or wet conditions as product will cake and become hard.

OTHER PRECAUTIONS Not Applicable.

VIII. CONTROL MEASURES

RESPIRATORY PROTECTION (Specify Type)
NIOSH/MSHA approved respirator for particulates.

VENTILATION	Local Exhaust	Ventilate as required to maintain airborne particulates below occupational exposure limits.
	Mechanical (General)	Dust collection equipment may be employed.
	Special/Other	not applicable.

PERSONAL PROTECTIVE EQUIPMENT

Protective Gloves Normal work gloves are adequate.

Eye Protection Eyeglasses or goggles should be worn in dusty areas.

Other Protective Clothing Or Equipment Protective clothing may be worn in dusty areas, but is generally not required.

Work/Hygiene Practices Warm water showering and handwashing is suggested after working in extremely dusty areas.

All statements, technical information and recommendations contained herein are, to the best of our knowledge, reliable and accurate; however, no warranty, either express or implied, is made with respect thereto, nor will any liability be assumed for damages resultant from the use of the material described.

It is the responsibility of the user to comply with all applicable federal, state, and local laws and regulations. It is also the responsibility of the user to maintain a safe workplace. The user should consider the health hazards and safety information provided herein as a guide and should take the necessary steps to instruct employees and to develop work practice procedures to ensure a safe work environment.

This information is not intended as a license to operate under, or a recommendation to practice or infringe upon any patent of this Company or others covering any process, composition of matter or use.

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NALCO

MATERIAL SAFETY DATA SHEET

PRODUCT
SOLUTION S0636 PA-2

Emergency Telephone Number
Medical (800) 452-5378 (24 hours) **(800) I-M-ALERT**

SECTION 1 PRODUCT IDENTIFICATION

TRADE NAME: SOLUTION S0636 PA-2
DESCRIPTION: PA-2, very dilute aqueous solution of a quaternary amine

NFPA 704M/HMIS RATING: 0/0 HEALTH 0/0 FLAMMABILITY 0/0 REACTIVITY 0 OTHER
0=Insignificant 1=Slight 2=Moderate 3=High 4=Extreme

SECTION 2 HAZARDOUS INGREDIENTS

Our hazard evaluation of the ingredient(s) under OSHA's Hazard Communication Rule, 29 CFR 1910.1200 has found none of the ingredient(s) hazardous.

SECTION 3 PRECAUTIONARY LABEL INFORMATION

Do not take internally.

SECTION 4 FIRST AID INFORMATION

Flush contacted area with water.

SECTION 5 HEALTH EFFECTS INFORMATION

PRIMARY ROUTE(S) OF EXPOSURE: Eye, Skin

EYE CONTACT: Non-irritating.
SKIN CONTACT: Non-irritating.

SYMPTOMS OF EXPOSURE: A review of available data does not identify any symptoms from exposure not previously mentioned.

SECTION 6 TOXICOLOGY INFORMATION

TOXICITY STUDIES: No toxicity studies have been conducted on this product.

SECTION 7 PHYSICAL AND CHEMICAL PROPERTIES

COLOR: Colorless	FORM: Liquid	ODOR: Odorless
SOLUBILITY IN WATER:	Completely	
SPECIFIC GRAVITY:	1.0	ASTM D-1298
pH (NEAT) =	Neutral	ASTM E-70
FLASH POINT:	None	

NOTE: These physical properties are typical values for this product.

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SECTION 8 FIRE AND EXPLOSION INFORMATION

FLASH POINT: None

EXTINGUISHING MEDIA: Not applicable

UNUSUAL FIRE AND EXPLOSION HAZARD: None

SECTION 9 REACTIVITY INFORMATION

INCOMPATIBILITY: None known

THERMAL DECOMPOSITION PRODUCTS: Not applicable

SECTION 10 PERSONAL PROTECTION EQUIPMENT

RESPIRATORY PROTECTION: Respiratory protection is not needed.

VENTILATION: General ventilation is recommended.

PROTECTIVE EQUIPMENT: Safety glasses should be worn when handling any liquid product.

SECTION 11 SPILL AND DISPOSAL INFORMATION

IN CASE OF TRANSPORTATION ACCIDENTS, CALL THE FOLLOWING 24-HOUR TELEPHONE NUMBER (800) I-M-ALERT or (800) 462-5378.

SPILL CONTROL AND RECOVERY:

Flush to laboratory drain or sewer with water.

DISPOSAL: If this product becomes a waste, it does not meet the criteria of a hazardous waste as defined under the Resource Conservation and Recovery Act (RCRA) 40 CFR 261, since it does not have the characteristics of Subpart C, nor is it listed under Subpart D.

Flush to laboratory drain or sanitary sewer with water.

SECTION 12 ENVIRONMENTAL INFORMATION

If released into the environment, see CERCLA in Section 14.

SECTION 13 TRANSPORTATION INFORMATION

PROPER SHIPPING NAME/HAZARD CLASS MAY VARY BY PACKAGING, PROPERTIES,

SECTION 14 REGULATORY INFORMATION (CONTINUED)

Consult Section 11 for RCRA classification.

FEDERAL WATER POLLUTION CONTROL ACT, CLEAN WATER ACT, 40 CFR 401.15 (formerly Sec. 307), 40 CFR 116 (formerly Sec. 311):
None of the ingredients are specifically listed.

CLEAN AIR ACT, Sec. 111 (40 CFR 60), Sec. 112 (40 CFR 61, 1990 Amendments), Sec. 611 (40 CFR 82, CLASS I and II Ozone depleting substances):
This product does not contain ingredients covered by the Clean Air Act.

STATE REGULATIONS:

CALIFORNIA PROPOSITION 65:
This product does not contain any chemicals which require warning under California Proposition 65.

MICHIGAN CRITICAL MATERIALS:
This product does not contain ingredients listed on the Michigan Critical Materials Register.

STATE RIGHT TO KNOW LAWS:
This product does not contain ingredients listed by State Right To Know Laws.

SECTION 15 ADDITIONAL INFORMATION

None

SECTION 16 USER'S RESPONSIBILITY

This product material safety data sheet provides health and safety information. The product is to be used in applications consistent with our product literature. Individuals handling this product should be informed of the recommended safety precautions and should have access to this information. For any other uses, exposures should be evaluated so that appropriate handling practices and training programs can be established to ensure safe workplace operations. Please consult your local sales representative for any further information.

SECTION 17 BIBLIOGRAPHY

ANNUAL REPORT ON CARCINOGENS, U.S. Department of Health and Human Services, Public Health Service, PB 33-135855, 1983.

CASARETT AND DOULL'S TOXICOLOGY, THE BASIC SCIENCE OF POISONS, Doull, J.,

SECTION 13 TRANSPORTATION INFORMATION (CONTINUED)

AND MODE OF TRANSPORTATION. TYPICAL PROPER SHIPPING NAMES FOR THIS PRODUCT ARE:

ALL TRANSPORTATION MODES : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

SECTION 14 REGULATORY INFORMATION

The following regulations apply to this product.

FEDERAL REGULATIONS:

OSHA'S HAZARD COMMUNICATION RULE, 29 CFR 1910.1200:
Based on our hazard evaluation, none of the ingredients in this product are hazardous.

CERCLA/SUPERFUND, 40 CFR 117, 302:
Notification of spills of this product is not required.

SARA/SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (TITLE III) - SECTIONS 302, 311, 312 AND 313:

SECTION 302 - EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355):
This product does not contain ingredients listed in Appendix A and B as an Extremely Hazardous Substance.

SECTIONS 311 and 312 - MATERIAL SAFETY DATA SHEET REQUIREMENTS (40 CFR 370):
Our hazard evaluation has found that this product is not hazardous under 29 CFR 1910.1200.

Under SARA 311 and 312, the EPA has established threshold quantities for the reporting of hazardous chemicals. The current thresholds are: 500 pounds or the threshold planning quantity (TPQ), whichever is lower, for extremely hazardous substances and 10,000 pounds for all other hazardous chemicals.

SECTION 313 - LIST OF TOXIC CHEMICALS (40 CFR 372):
This product does not contain ingredients on the List of Toxic Chemicals.

TOXIC SUBSTANCES CONTROL ACT (TSCA):
The chemical ingredients in this product are on the 8(b) Inventory List (40 CFR 710).

RESOURCE CONSERVATION AND RECOVERY ACT (RCRA), 40 CFR 261 SUBPART C & D:

SECTION 17 BIBLIOGRAPHY (CONTINUED)

Klaassen, C. D., and Admur, M. O., eds., Macmillian Publishing Company, Inc., N. Y., 2nd edition, 1980.

CHEMICAL HAZARDS OF THE WORKPLACE, Proctor, N. H., and Hughes, J. P., eds., J. P. Lipincott Company, N.Y., 1981.

DANGEROUS PROPERTIES OF INDUSTRIAL MATERIALS, Sax, N. Irving, ed., Van Nostrand Reinhold Company, N.Y., 6th edition, 1984.

IARC MONOGRAPHS ON THE EVALUATION OF THE CARCINOGENIC RISK OF CHEMICALS TO MAN, Geneva: World Health Organization, International Agency for Research on Cancer, 1972-1977.

PATTY'S INDUSTRIAL HYGIENE AND TOXICOLOGY, Clayton, G. D., Clayton, F. E., eds., John Wiley and Sons, N. Y., 3rd edition, Vol. 2 A-C, 1981.

REGISTRY OF TOXIC EFFECTS ON CHEMICAL SUBSTANCES, U.S. Department of Health and Human Services, Public Health Service, Center for Disease Control, National Institute for Occupational Safety and Health, 1983 supplement of 1981-1982 edition, Vol. 1-3, OH, 1984.

Title 29 Code of Federal Regulations Part 1910, Subpart Z, Toxic and Hazardous Substances, Occupational Safety and Health Administration (OSHA).

THRESHOLD LIMIT VALUES FOR CHEMICAL SUBSTANCES AND PHYSICAL AGENTS IN THE WORKROOM ENVIRONMENT WITH INTENDED CHANGES, American Conference of Governmental Industrial Hygienists, OH.

Information on this MSDS has changed. The changes are indicated by asterisks on the right side of only the changed sections. This is an updated MSDS as required by OHSA's Hazard Communication Rule 29 CFR 1910.1200.

PREPARED BY: Ricky A. Stackhouse PhD., Toxicologist
DATE CHANGED: 06/28/95 DATE PRINTED: 07/01/95

NALCO

MATERIAL SAFETY DATA SHEET

PRODUCT

Emergency Telephone Number

Medical (800) 462-5378 (24 hours) (800) I-M-ALERT

Reading Comprehension - Pesticide Application & Control

Activity 1 - Reading Comprehension

Objective (s): This activity will enable participants

1. To practice reading and applying information.

Directions: Read the paragraph below and answer the questions. You may refer back to the paragraph.

The Environmental Protection Agency has particular standards for pesticide application in and around food manufacturing plants. Specific employees are trained in the principles of applying pesticides safely for man and the environment. They are taught about application equipment, methods of application and the basic of insecticides, rodenticides, and avicides. Insecticides are used to kill insects. Rodenticides kill rodents such as field mice and avicides are pesticides used to control birds. These employees are required to be certified in compliance with EPA's Standards of Certification. The certification exam is administered by the Virginia Department of Agriculture and Consumer Services. At Nabisco, the employees who are certified to conduct pesticide application are called Utility Technicians.

Utility Technicians are aware of the pests that are associated with food manufacturing plants. Some of those pests include birds, weeds, rodents, and insects. The type and pests most likely to occur will depend on both the geographical location of the food manufacturing plant and the type of food being processed. These pests are able to damage, destroy, and contaminate. They must be controlled to protect the quality of the Nabisco's product. If quality is not maintained, federal and state agencies have authority to seize food products or take other action.

Questions:

1. What would you say would be an appropriate theme for the paragraph above?______________________________

____

2. What are the three kinds of pests that plague food manufacturing facilities?______________________________

3. The kind of pests that are associated with a manufacturing plant depends upon the location of the plant and what country it is located in? Check one: True ____ False____

4. What action can the state or federal agency take if food products are contaminated?______________________________

5. What can pests do to food manufacturing plants products?

____

6. The individuals at Nabsico that are certified to conduct pesticide control are called (circle one) : a. Pesticide Agents
b. Utility Technicians c. Pesticide Applicants

7. Name three areas of training for those who apply pesticides in food manufacturing plants______________________________

____

8. What kind of pesticide is used to control birds in a pest situation?______________________________

9. Rodenticides are used to control insects? True____ False____

Activity 2 - Reading Comprehension - Pesticide Control

Objective: This activity will enable participants

1. To practice reading and applying information

Directions: Read the paragraph below and answer the questions.

Understanding Pesticide Control for Birds

There are many species of birds in the United States, but only three are considered pests around food manufacturing plants. They are the English Sparrows (sometimes called the House Sparrows), Pigeons, and Starlings. Since these birds live in such close proximity to man, one would wonder how they can be such a pest.

They are considered pests in a manufacturing situation because their droppings can contaminate food products. Simply put, they can spread diseases. Their droppings have been known to plug gutters, cause roofs to leak, and they carry mites that can bite people.

Pesticide technicians can contain these birds in three ways: (1) setting traps (2) shooting them (3) using avicides or other pesticides to control them.

Questions:

1. What are three ways Utility Technicians can control birds?
   ____________________, ____________________, ____________________
2. What is a common name for the English Sparrow?_______________
3. Why are birds considered pests?________________________________

Activity 3 - Reading Comprehension--Pesticide Control

Objective: This activity will enable participants

1. To practice reading and applying information.

Directions: Read the descriptions below and answer the questions. Identify the pests described in the statements by filling in the blank with the correct letter.

A. **English Sparrow**
Grayish in color
3-4 inches long
Male has a black throat and small conical beak
Has an non-musical chirp and a creamy white egg

B. **Pigeons**
Varied colors
6-10 inches long
Fan shaped tail on take-off and landing
Head bobs and beak pointed down when walking
Voice is long, soft coo-oo-o
White eggs

C. **Starlings**
Body and wings gold-flecked
Large spear-like bills that are yellow or olive
Compact, short bodies, 4-7 inches long
Bluish green eggs

D. **House Mouse (Mus Muscualus)**
Weighs 1/2 to 3/4 oz.
Small head an body
Fur, silky, dusky gray

E. **Norway Rate (Rattus Norvegicus)**
Weights 10-17 oz.
Blunt Muzzle head, heavy thick body
Fur, coarse, normally red-brown
to gray brown

F. **Roof Rat (Rattus rattus)**
Weighs 8-12 oz.
Pointed Muzzle head, slender body
Fur, black and slate gray, tawny above,
gray white-below, tawny above, white to
lemon belly

G. **German Cockroach**
Most common and widespread
Small, about 3/4" long
Yellowish brown with two dark-brown stripes
behind head

H. **American Cockraoch**
Largest in the U.S.
Adults grow to 2"
Adults color is brown, the young
pale brown

Questions:

1. Common name is a House Sparrow?____
2. Bobs head when walking?_____
3. Has bluish green eggs?____
4. Most common cockroach?____
5. Has silky, dusty gray fur?____
6. Weighs 10 to 17 oz. and is a rodent?____
7. Grows up to 2" as an adult insect?____
8. Has a pointed muzzle head and a slender body?____

Activity 4 - Following Directions Drawing

Objective - To have participants practice reading comprehension skills.

Directions - 1. Use a blank sheet of paper and follow the written directions below.

a. Draw a triangle with sides of equal length in the upper right corner.

b. In the center draw a square about an inch on each side.

c. Draw an arrow from the triangle to the square.

d. Below the square draw five lines, one below the other, each the same length as the side of the square.

e. Draw a circle in the lower left corner.

f. Make a dotted line from the circle to the second line below the square.

g. If the square is below the circle, color in the triangle.

h. If an even number of the lines below the square are not connected to any of the figures, place an X in the square.

Activity 5 - Reading Comprehension - Pesticide Control

Objective: This activity will enable participants

1. To practice reading and applying information.

Directions: Read the paragraph and answer the questions.

The First Step, Know Your Common Pests

The first step in investigating and solving your pest problem is to determine the species of the pests that is troubling your operation. We understand that there are different nationalities of people. Well, the same is true for pests. Pest control programs have to be designed to target specific pests. The rule of thumb is to fit the pesticide to the pest.

Questions:

1. What is the first step in solving your pest problem?______
____
2. What is the rule of thumb in designing pest control programs?____
____
3. General pest control programs are the most effective?
True____ False_____

Activity 6 - Reading Comprehension - Pesticide Control

Objective: This activity will enable participants

1. To practice reading and applying information.

Directions: Read the pest descriptions below and answer the questions. Identify the pest described by the statement by filling in the blank with the correct letter.

A. Ants
Large head, elbowed antennae
Narrow waist, no wings

B. Bed Bugs
Small rounded, dark brown
No wings, may be engorged with blood

C. Bees
Light brown if honey bees
with a hairy body

D. Booklice
Minute, place colored body
No wings

E. Boxelder Bugs
Bright red and black
Long antennae
Narrow head with peak

F. Carpet Beetles
Adults, small rounded, brown
Larvae elongate, brown body with long brown hairs

G. Centipedes
One pair of legs per body
segment, long antennae

H. **Millipedes**
Two pair of legs per body segment
Short antennae

I. **Fleas**
Adults, very small, laterally compressed
No wings
Bloodsucking parasite of warm-blooded animals

J. **Clothes Moths**
Adults, very small, pale white
Wings pale white, without spots

K. **Silverfish**
Small, pale gray, elongate
Antennae long, tail with long spines

L. **Ticks**
Adults, brown to dark brown
Sometimes with white spots, eight legs
Blood sucking parasites of mammals

M. **Saw-Toothed Grain Beetle**
A pantry pest
Adults, small, dark brown
with small spines on body region behind
head, love to infest flour

N. **Indian Meal Moth**
A pantry pest
Adult, two colored wings, pale
gray and redish brown
Love all grain products

O. **House Mouse**
Adults have small eyes and small feet
Tail is as long as the body
Adults are 2 1/2 to 3 1/2 in head and
body length

P. **Moth Flies**

Adults, small,oval shaped
Wings pointed and covered with hairs,
body small and full of hair

Questions:

1. These pests love gain products of all kinds?____
2. They have small eyes and small feet, and long tails?____
3. They do not have wings, narrow waist, and large head?____
4. They are bright read and black, with narrow head and peak?____
5. They're light brown and produce honey?____
6. They have one pair of legs per body part?____
7. Their wings are pointed and they are covered with hairs?____
8. They are blood sucking parasites of mammals?____
9. They have three long spines?____
10. The adults are usually brown, small and rounded?____

Reading Comprehension - Fumigation

Activity 7 -Reading Comprehension

Objective: This activity will enable participants

1. To practice reading and applying information.

Directions: Read the paragraph below about fumigation. Then answer the questions.

What and Why of Fumigation

Fumigation is the process of distributing the pesticide chemicals called fumigants as a gas through space and materials. Fumigants are in the gas phase at effective temperatures, as compared to smokes, fogs, and aerosols which are dispersions of very fine particles or droplets.

The fumigation process requires that safety precautions, special equipment and specific knowledge. That is why individuals who do fumigation are required to have special licenses or permits. Only experienced and certified applicators should conduct fumigation.

Many factors affect the use and effectiveness of fumigants. The developmental stage and activity of a targeted pest is important. For example, active adult insects are easier to kill than inactive hibernating adults. The amount of free and open space in the area to be fumigated, the temperature, and the proximity of the product, the kind of product, the location of the pest within the product, and the structures to be fumigated all affect dosage and exposure period.

Temperature is the most important factor influencing the action of a fumigant on a pest. The dosage and exposure periods vary for most fumigants with the temperature. A fumigant gas should be spread evenly and quickly throughout the space to be treated. Therefore, air movement and diffusion is important.

(continued next page)

Sorption of fumigants is the association of the fumigant with the material and/or the surface being fumigated thus removing part of the fumigant from the vapor state. Both absorption and adsorption are reduced at higher temperatures. Adsorption is usually greater with fumigants of higher molecular weights and low vapor pressures.

As the moisture content of a commodity increases, it becomes more difficult for the fumigant to penetrate it. Adequate moisture, is required for the generation of some fumigants, and with living plants may reduce injury.

The condition of the structure and type of construction must be considered. Fumigation in vacuum chambers provides increased efficiency. Other general characteristics of the fumigants are important such as molecular weight boiling point, water, solubility and flammability.

Questions:

1. What are the general characteristics of fumigants that must be considered?____
____

2. Is it more efficient to spray in vacuumed chambers?
Yes___ No____

4. The temperature is the most important element to consider when using fumigants. True____ False____

5. Fumigants are chemical gases. True____ False___

Reading Comprehension - Fumigation

Activity 8 -Reading Comprehension

Objective: This activity will enable participants

1. To practice reading and applying information.

Materials Needed: Pencil, Chart handout on Fumigants Properties

Directions: Read the chart about the essential properties of fumigants that are commonly used in insect control. Then answer the questions.

Questions:

1. Which formula is usually used as an ingredient of nonflammable mixtures?______________________________
2. Which fumigant may be phytotoxic. It is safe for use on seeds but not recommended for fresh fruit or vegetables?
   ____
3. What is the boiling point of Sulfuryl Fluoride?_________
4. Which fumigants are nonflammable?_________________________
   ____
   ____
5. What is the molecular weight of Chloropicrin?_____________
6. Is Hydrocyanic acid gas soluble in water? Yes____ No____

ESSENTIAL PROPERTIES OF FUMIGANTS

Name and Formula	Molecular Weight	Boiling Point (°C. at 760 mm. pressure)	Solubility in Water (g./100 ml.)
Acrylonitrile	53.06	77.0	7.5 at 25° C.
Carbon disulphide	76.13	46.3	0.22 at 22° C.
Carbon tetrachloride	153.84	77.0	0.08 at 20° C.
Chloropicrin	164.39	112.0	Insoluble at 20° C.
Ethylene dibromide	187.88	131.0	0.43 at 30° C.
Ethylene dichloride	98.97	83.0	0.87 at 20° C.
Ethylene oxide	44.05	10.7	Very soluble at 20° C.
Hydrocyanic acid gas	27.03	26.0	Very soluble at 20° C.
Methyl bromide	94.95	3.6	1.3 at 25° C.
Phosphine	34.04	-87.4	Very slightly soluble
Sulfuryl fluoride	102.06	-55.2	0.075 at 25° C.

1/ From Monro, Manual of Fumigation for insect Control.

IN COMMON USE FOR INSECT CONTROL1/

Flammability (% by volume in air)	Commodities Treated and Remarks (Check labels for specific uses)
3-17	Tobacco and plant products; also for "spot" treatment. Injures growing plants, fresh fruits, and vegetables. Marketed with carbon tetrachloride.
1.25-44	Grain. Usually as ingredient of nonflammable mixtures.
Nonflammable	Only weakly insecticidal. Used chiefly in mixture with flammable compounds in grain fumigation to reduce fire hazard and aid distribution.
Nonflammable	Grains and plant products. Safe with seeds; injurious to living plants, fruit, and vegetables. Highly irritating lachrymator. Bactericidal and fungicidal.
Nonflammable	General fumigant. Particularly useful for certain fruit; may injure growing plants.
6-16	Seeds and grains. Usually mixed with carbon tetrachloride.
3-80	Grains, cereals, and certain plant products. Toxic at practical concentrations to many bacteria, fungi, and viruses. Strongly phytotoxic and affects seed germination.
6-41	General fumigant, but may be phytotoxic. Safe on seeds but not recommended for fresh fruit and vegetables.
Nonflammable	General fumigant. May be used with caution for nursery stock, growing plants, some fruit, and seeds of low moisture content.
Highly flammable	Grain fumigant; gas generated from tablets of aluminum phosphide.
Nonflammable	Wood destroying and household insects, but not for food or drug products. Phytotoxic but little effect on seed germination.

Betty just arrived home late from work and has to prepare a dessert to take to a PTA function tonight. She has only one hour to prepare the dessert and get to the school.

These are the items Betty has available to her:

5 lb. bag sugar
1 box salt
1 dozen eggs
1 qt. milk
2 lb. bag flour
pie crust mix
1 bottle vanilla extract
1 can cream of tartar
one large lemon
1 can cinnamon
1/2 lb. margarine
lemon extract
1/2 box of Nilla Wafers
1/3 box of Ritz crackers
1/2 dozen bananas

Read the recipes and the labels on the following pages and answer the following questions.

1. Does Betty have all the ingredients she needs to make each one of these desserts?

2. Does Betty have the right quantity of the ingredients that she needs to make each of these desserts?

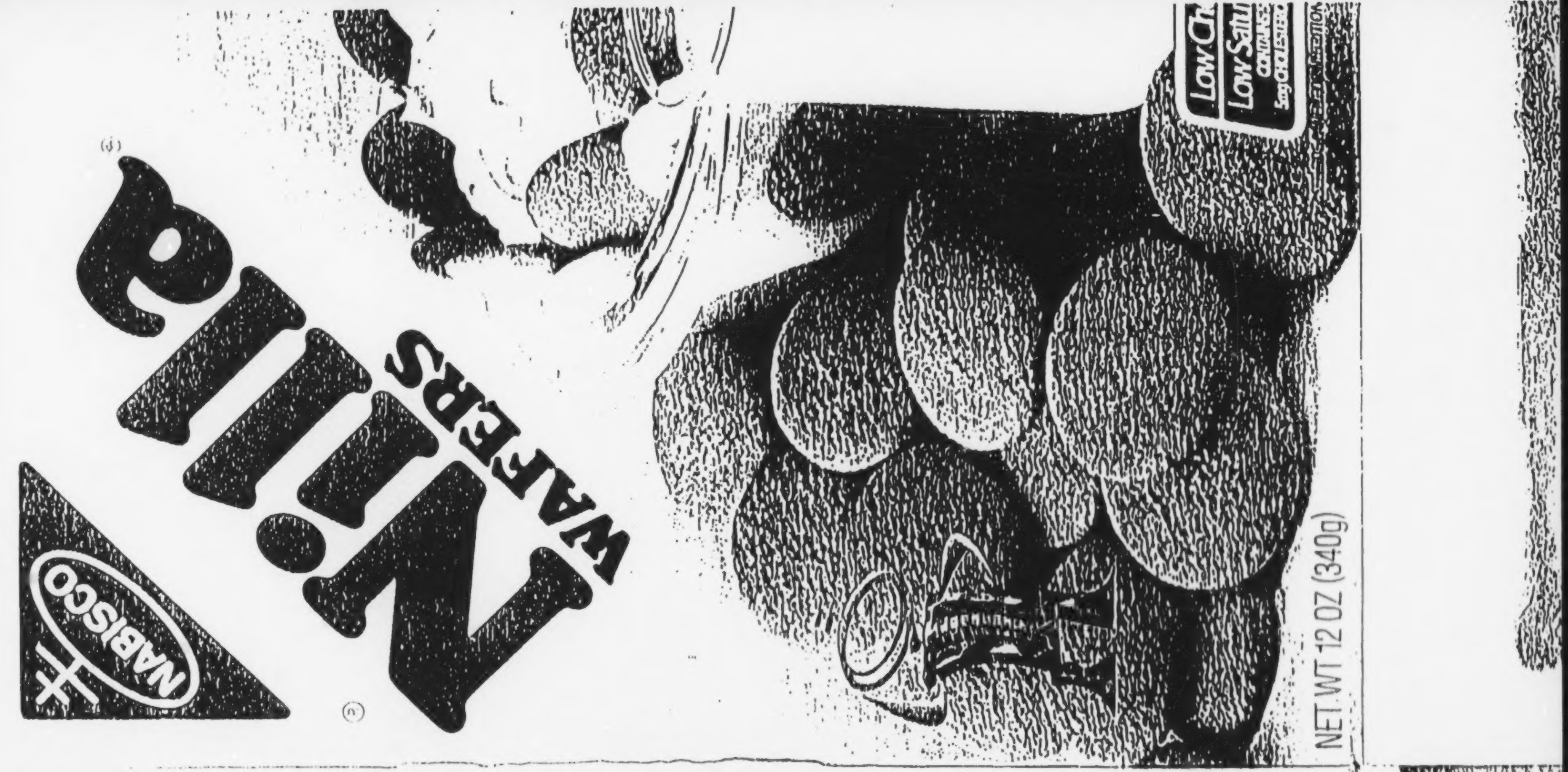
3. Which recipe would require the most time to prepare?

4. What ingredients do the two recipes have in common?

5. According to the label, how many cookies are in the Nilla Wafers box?

6. According to the label, how many crackers are in the Ritz box ?

7. Which of the two desserts do you think Betty should make and why ?



NABISCO

Nilla
WAFERS

ORIGINAL BANANA PUDDING

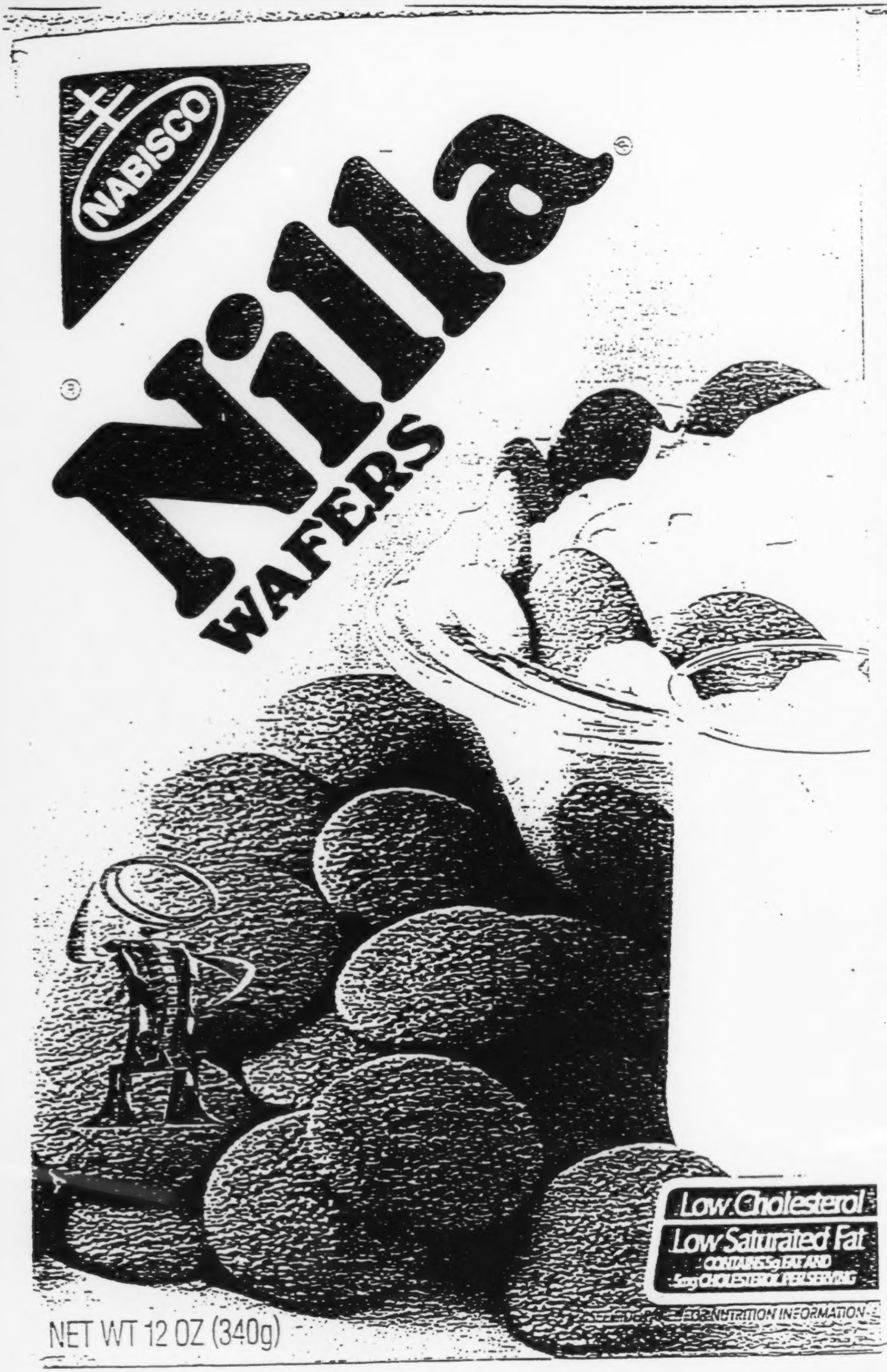
MAKES 16 (1/2 CUP) SERVINGS

3/4 cup granulated sugar
1/3 cup all-purpose flour
Dash of salt
4 eggs, separated, at room temperature
2 cups milk
1/2 teaspoon vanilla extract
35 to 45 NILLA Wafers
5 to 6 medium size fully ripe bananas, sliced

Reserve 1 banana and 10 to 12 NILLA Wafers for garnish.

Combine 1/2 cup sugar, flour and salt in top of double boiler. Stir in 4 egg yolks and milk; blend well. Cook, uncovered, over boiling water, stirring constantly until thickened. Reduce heat and cook, stirring occasionally, for 5 minutes. Remove from heat; add vanilla. Spread small amount on bottom of 1-1/2-quart casserole; cover with layer of NILLA Wafers. Top with layer of sliced bananas.

Pour about 1/3 of custard over bananas. Continue to layer wafers, bananas, and custard to make 3 layers of each, ending with custard. Beat egg whites until stiff but not dry; gradually add remaining 1/4 cup sugar and beat until stiff peaks form. Spoon on top of pudding, spreading to cover entire surface and sealing well to edges. Bake at 425°F. for 5 minutes or until delicately browned. Cool slightly or chill. Just before serving, garnish with banana slices, then NILLA Wafers upright around edge of dish, as pictured on package.


NABISCO
Nilla
WAFERS
Low Cholesterol
Low Saturated Fat
CONTAINS 5g FAT AND 5mg CHOLESTEROL PER SERVING
FOR NUTRITION INFORMATION
NET WT 12 OZ (340g)

Nilla Wafers...

- Low Cholesterol
- Low Saturated Fat

CONTAINS 5g FAT AND 5mg CHOLESTEROL PER SERVING

Nutrition Facts

Serving Size 8 cookies (32 g)
Servings Per Container About 11

Amount Per Serving

Calories 140	Calories from Fat 40
	% Daily Value*
Total Fat 5g	7%
Saturated Fat 1g	5%
Polyunsaturated Fat 0g	
Monounsaturated Fat 1.5g	
Cholesterol 5mg	2%
Sodium 105mg	4%
Total Carbohydrate 24g	8%
Dietary Fiber 0g	0%
Sugars 12g	
Protein 2g	

Vitamin A 0% • Vitamin C 0%
Calcium 2% • Iron 4%

* Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs:

		Calories: 2,000	2,500
Total Fat	Less than	65g	80g
Sat Fat	Less than	20g	25g
Cholesterol	Less than	300mg	300mg
Sodium	Less than	2400mg	2400m
Total Carbohydrate		300g	375g
Dietary Fiber		25g	30g

Calories per gram:
Fat 9 • Carbohydrate 4 • Protein 4

INGREDIENTS: ENRICHED WHEAT FLOUR (CO TAINS NIACIN, REDUCED IRON, THIAMIN MONONITRATE [VITAMIN B_1], RIBOFLAVIN [VIT MIN B_2]), SUGAR, VEGETABLE SHORTENIN (PARTIALLY HYDROGENATED SOYBEAN OIL HIGH FRUCTOSE CORN SYRUP, WHEY, BUTT (PASTEURIZED CREAM, SALT, ANNATTO COLO EGGS, LEAVENING (BAKING SODA, CALCIU PHOSPHATE), SALT, MONO-AND DIGLYCERID (EMULSIFIER), VANILLA EXTRACT, ARTIFICI FLAVOR.

This package is sold by weight, not by volum Packed as full as practicable by modern au matic equipment, it contains full net wei indicated. If it does not appear full wh opened, it is because contents have sett during shipping and handling.

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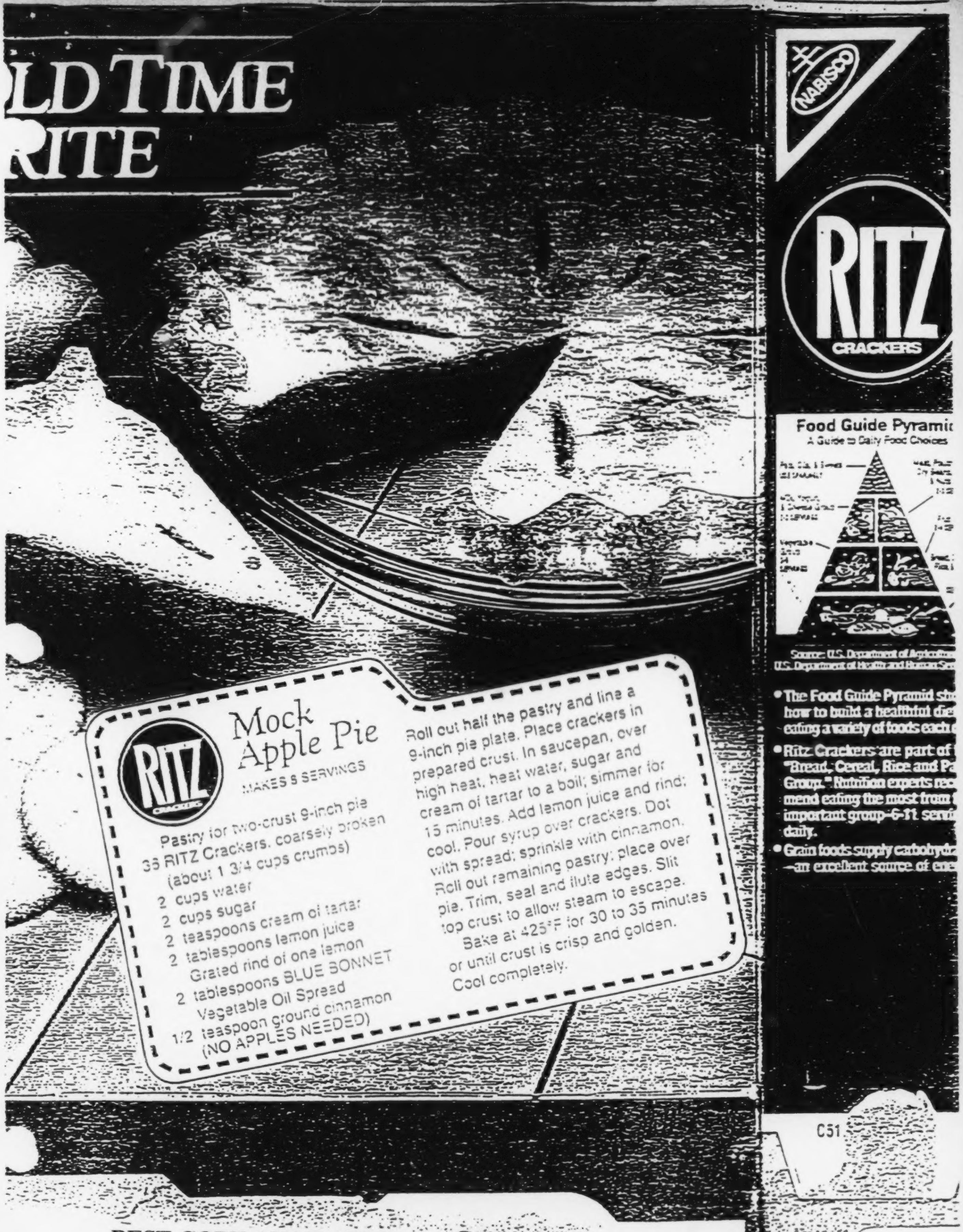

Mock Apple Pie

MAKES 8 SERVINGS

Pastry for two-crust 9-inch pie
36 RITZ Crackers, coarsely broken
(about 1 3/4 cups crumbs)
2 cups water
2 cups sugar
2 teaspoons cream of tartar
2 tablespoons lemon juice
Grated rind of one lemon
2 tablespoons BLUE BONNET
Vegetable Oil Spread
1/2 teaspoon ground cinnamon
(NO APPLES NEEDED)

Roll out half the pastry and line a 9-inch pie plate. Place crackers in prepared crust. In saucepan, over high heat, heat water, sugar and cream of tartar to a boil; simmer for 15 minutes. Add lemon juice and rind; cool. Pour syrup over crackers. Dot with spread; sprinkle with cinnamon. Roll out remaining pastry; place over pie. Trim, seal and flute edges. Slit top crust to allow steam to escape.

Bake at 425°F for 30 to 35 minutes or until crust is crisp and golden. Cool completely.

Food Guide Pyrami

A Guide to Daily Food Choices

Source: U.S. Department of Agricu
U.S. Department of Health and Human Se

- The Food Guide Pyramid s
  how to build a healthful die
  eating a variety of foods each
- Ritz Crackers are part of
  "Bread, Cereal, Rice and Pa
  Group." Nutrition experts rec
  mend eating the most from
  important group–6-11 servi
  daily.
- Grain foods supply carbohyd
  —an excellent source of ene

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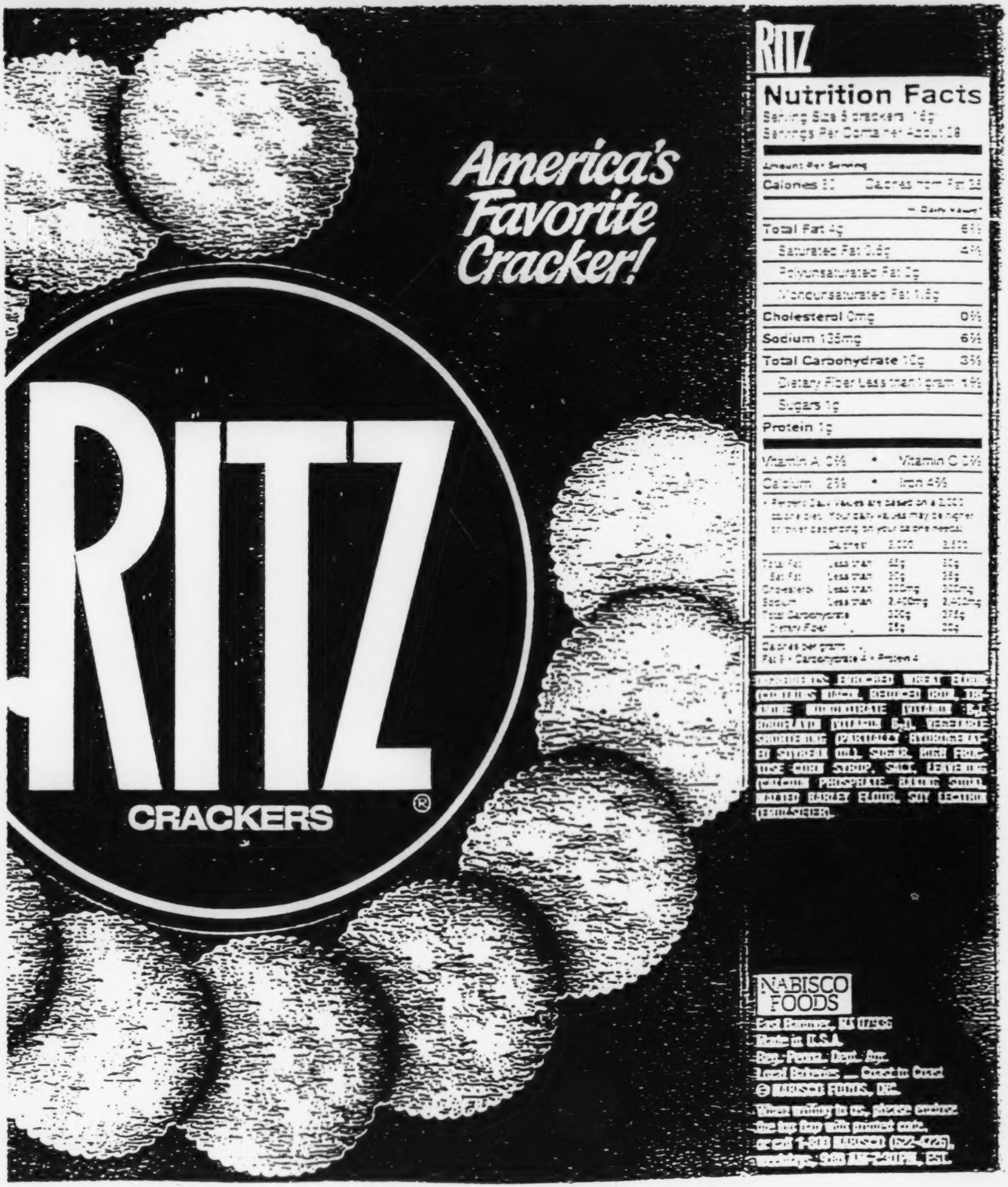

Nutrition Facts

Serving Size 5 crackers (16g)
Servings Per Container About 28

Amount Per Serving	
Calories 80	Calories from Fat 35
	% Daily Value*
Total Fat 4g	6%
Saturated Fat 0.5g	4%
Polyunsaturated Fat 0g	
Monounsaturated Fat 1.5g	
Cholesterol 0mg	0%
Sodium 135mg	6%
Total Carbohydrate 10g	3%
Dietary Fiber Less than 1 gram	1%
Sugars 1g	
Protein 1g	

Vitamin A 0% • Vitamin C 0%
Calcium 2% • Iron 4%

* Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs:

	Calories:	2,000	2,500
Total Fat	Less than	65g	80g
Sat Fat	Less than	20g	25g
Cholesterol	Less than	300mg	300mg
Sodium	Less than	2,400mg	2,400mg
Total Carbohydrate		300g	375g
Dietary Fiber		25g	30g

Calories per gram:
Fat 9 • Carbohydrate 4 • Protein 4

INGREDIENTS: ENRICHED WHEAT FLOUR (CONTAINS NIACIN, REDUCED IRON, THIAMINE MONONITRATE [VITAMIN B1], RIBOFLAVIN [VITAMIN B2]), VEGETABLE SHORTENING (PARTIALLY HYDROGENATED SOYBEAN OIL), SUGAR, HIGH FRUCTOSE CORN SYRUP, SALT, LEAVENING (CALCIUM PHOSPHATE, BAKING SODA), MALTED BARLEY FLOUR, SOY LECITHIN (EMULSIFIER).

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Local Bakeries — Coast to Coast
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CONTROL CHART NB-5260-E

DATE	PRODUCT	SHIFT	ATTRIBUTE	LINE NO	OPER

TIME

ANALYSIS
1
2
3
4
5
6

SUM Σ

AVERAGE $\bar{X}$

RANGE R

UCL

AIM

LCL

UCL

RANGE

ASSIGNABLE CAUSE LOG

ACTION	CAUSE

DECISION RULES

1	IN RED
2 OF 3	IN YELLOW (ALL ON SAME SIDE OF AIM)
5	IN A ROW (ALL ON SAME SIDE OF AIM)
5	IN A ROW IN AN UPWARD OR DOWNWARD TREND (BETWEEN CONTROL LIMITS)

INVESTIGATE/REACT/DOCUMENT

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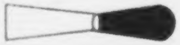
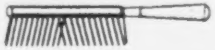
RICHMOND, VA BAKERY CONTAINERS

NON-FOOD CONTACT UTENSILS AND CONTAINERS

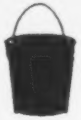

BLACK HANDLED SCRAPER

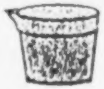
BLUE HOT MELT SCOOP

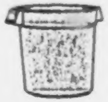

GREEN BRISTLED BAG BRUSH

BROWN REFUSE CONTAINER

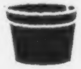
GREEN PAPER/SALT RECEPTACLE

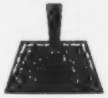

RED EH&S FLOOR WAX BUCKET

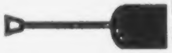

GREY CLEANING BUCKET


GREY 30/50 GAL TRASH CAN

GREEN WASTE OIL BUCKET


BLACK MOTOR OIL BUCKET

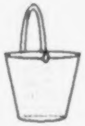

BROWN / BLUE DUST PAN


RED REFUSE B&R SHOVEL

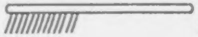
BLACK HANDLED BRUSH

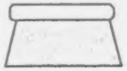
BLACK SCRAPER

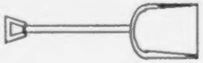
BLACK SCRUB BRUSH

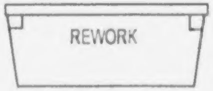

STAINLESS MINOR INGREDIENT BUCKET

FOOD CONTACT UTENSILS AND CONTAINERS WHITE AND STAINLESS

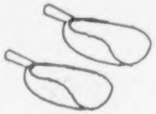

WHITE HANDLED BRUSH


WHITE SCRAPER


WHITE (USEABLE) B&R SHOVEL

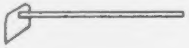


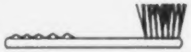
CLEAR REWORK BINS

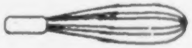

WHIITE AND STAINLESS SCOOPS

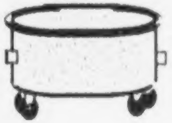
WHITE TUBS FOR BUTTER

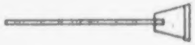
STAINLESS BUTTER CUTTER

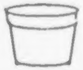

STAINLESS SCRAP DOUGH RAKE

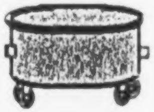

WHITE SCRUB BRUSH


STAINLESS WISP


STAINLESS DOUGH / MEAL TROUGH


STAINLESS PROOF ROOM SCRAPER


WHITE APRON WATER BUCKET


GREY USEABLE B&R TROUGH

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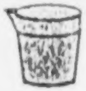
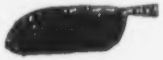
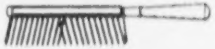
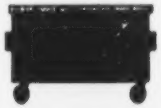
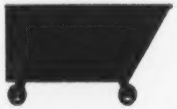
NON-FOOD CONTACT UTENSILS AND CONTAINERS

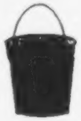

GREY CLEANING BUCKET

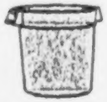

BLUE HOT MELT SCOOP

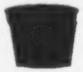

GREEN BRISTLED BAG BRUSH

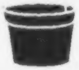

BROWN REFUSE CONTAINER

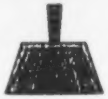

GREEN PAPER/SALT RECEPTACLE

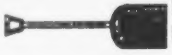

RED EH&S FLOOR WAX BUCKET


GREY 30/50 GAL TRASH CAN

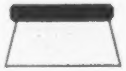

GREEN WASTE OIL BUCKET


BLACK MOTOR OIL BUCKET

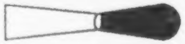

BROWN / BLUE DUST PAN


RED REFUSE B&R SHOVEL

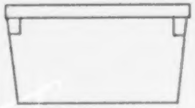
BLACK HANDLED BRUSH

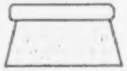

BLACK SCRAPER

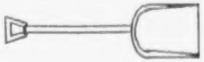
BLACK SCRUB BRUSH

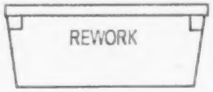

BLACK HANDLED SCRAPER

FOOD CONTACT UTENSILS AND CONTAINERS WHITE AND STAINLESS

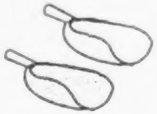

WHITE TUBS FOR BUTTER

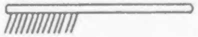

WHITE SCRAPER

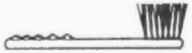

WHITE (USEABLE) B&R SHOVEL



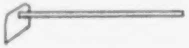
CLEAR REWORK BINS

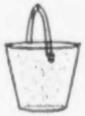

WHIITE AND STAINLESS SCOOPS

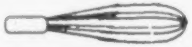

WHITE HANDLED BRUSH


WHITE SCRUB BRUSH

STAINLESS BUTTER CUTTER


STAINLESS SCRAP DOUGH RAKE


STAINLESS MINOR INGREDIENT BUCKET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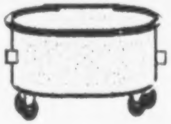
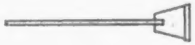
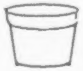
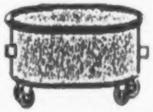

STAINLESS DOUGH / MEAL TROUGH


STAINLESS PROOF ROOM SCRAPER

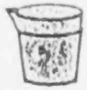

WHITE APRON WATER BUCKET


GREY USEABLE B&R TROUGH

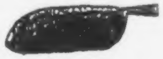
NABISCO
BRANDS INC

RICHMOND, VA BAKERY CONTAINERS

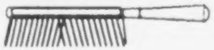
NON-FOOD CONTACT UTENSILS AND CONTAINERS



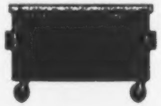
GREY CLEANING BUCKET



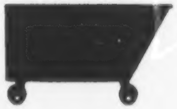
BLUE HOT MELT SCOOP



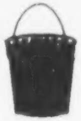
GREEN BRISTLED BAG BRUSH



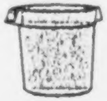
BROWN REFUSE CONTAINER



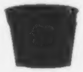
GREEN PAPER/SALT RECEPTACLE



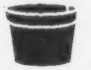
RED EH&S FLOOR WAX BUCKET



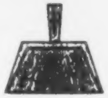
GREY 30/50 GAL TRASH CAN



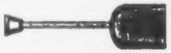
GREEN WASTE OIL BUCKET



BLACK MOTOR OIL BUCKET



BROWN / BLUE DUST PAN

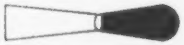


RED REFUSE B&R SHOVEL

BLACK HANDLED BRUSH

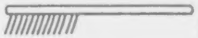
BLACK SCRAPER

BLACK SCRUB BRUSH



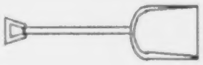
BLACK HANDLED SCRAPER

FOOD CONTACT UTENSILS AND CONTAINERS WHITE AND STAINLESS

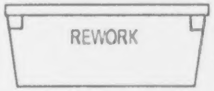


WHITE HANDLED BRUSH

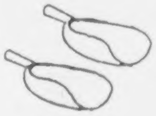
WHITE SCRAPER



WHITE (USEABLE) B&R SHOVEL

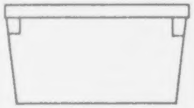


CLEAR REWORK BINS



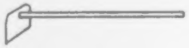
WHIITE AND STAINLESS SCOOPS

WHITE SCRUB BRUSH

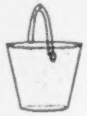


WHITE TUBS FOR BUTTER

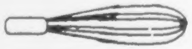
STAINLESS BUTTER CUTTER



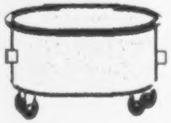
STAINLESS SCRAP DOUGH RAKE



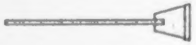
STAINLESS MINOR INGREDIENT BUCKET



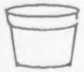
STAINLESS WISP



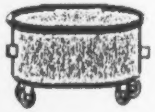
STAINLESS DOUGH / MEAL TROUGH



STAINLESS PROOF ROOM SCRAPER



WHITE APRON WATER BUCKET

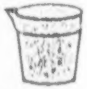


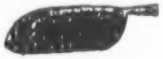
GREY USEABLE B&R TROUGH

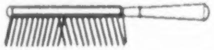
NABISCO BRANDS INC

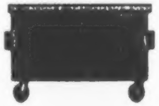
RICHMOND, VA BAKERY CONTAINERS

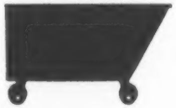
NON-FOOD CONTACT UTENSILS AND CONTAINERS

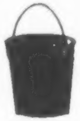

GREY CLEANING BUCKET

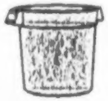

BLUE HOT MELT SCOOP


GREEN BRISTLED BAG BRUSH

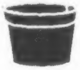

BROWN REFUSE CONTAINER

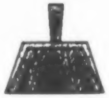

GREEN PAPER/SALT RECEPTACLE

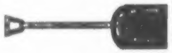

RED EH&S FLOOR WAX BUCKET

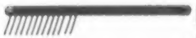

GREY 30/50 GAL TRASH CAN

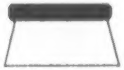
GREEN WASTE OIL BUCKET


BLACK MOTOR OIL BUCKET

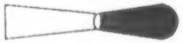

BROWN / BLUE DUST PAN


RED REFUSE B&R SHOVEL

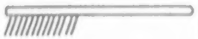

BLACK HANDLED BRUSH


BLACK SCRAPER

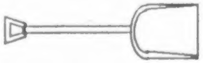
BLACK SCRUB BRUSH

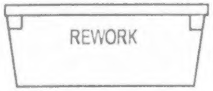

BLACK HANDLED SCRAPER

FOOD CONTACT UTENSILS AND CONTAINERS WHITE AND STAINLESS

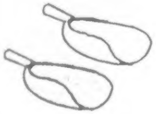

WHITE HANDLED BRUSH

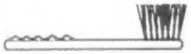
WHITE SCRAPER

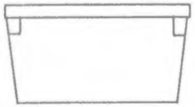

WHITE (USEABLE) B&R SHOVEL



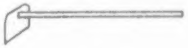
CLEAR REWORK BINS

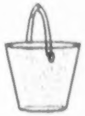

WHIITE AND STAINLESS SCOOPS

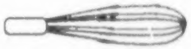

WHITE SCRUB BRUSH

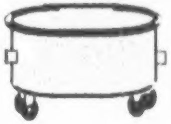

WHITE TUBS FOR BUTTER

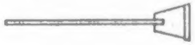
STAINLESS BUTTER CUTTER

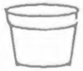

STAINLESS SCRAP DOUGH RAKE

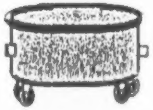

STAINLESS MINOR INGREDIENT BUCKET


STAINLESS WISP


STAINLESS DOUGH / MEAL TROUGH


STAINLESS PROOF ROOM SCRAPER

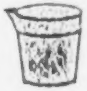

WHITE APRON WATER BUCKET

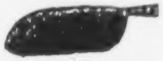

GREY USEABLE B&R TROUGH

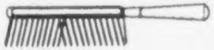
NABISCO
BRANDS INC

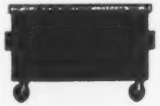
RICHMOND, VA BAKERY CONTAINERS

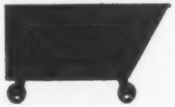
NON-FOOD CONTACT UTENSILS AND CONTAINERS

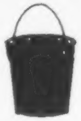

[illegible] CLEANING
BUCKET

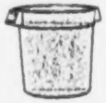

BLUE HOT MELT
SCOOP


GREEN BRISTLED
BAG BRUSH

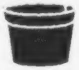

BROWN REFUSE
CONTAINER

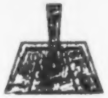

GREEN
PAPER/SALT
RECEPTACLE

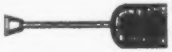

RED EH&S
FLOOR WAX
BUCKET

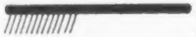

GREY 30/50 GAL
TRASH CAN

GREEN WASTE OIL
BUCKET


BLACK MOTOR OIL
BUCKET

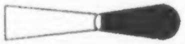

BROWN / BLUE
DUST PAN


RED REFUSE
B&R SHOVEL

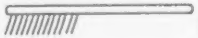

BLACK HANDLED
BRUSH

BLACK SCRAPER

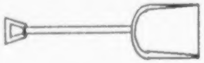
BLACK SCRUB
BRUSH

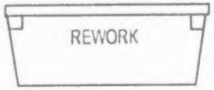

BLACK HANDLED
SCRAPER

FOOD CONTACT UTENSILS AND CONTAINERS WHITE AND STAINLESS

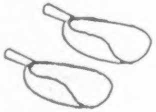

WHITE HANDLED
BRUSH

WHITE SCRAPER

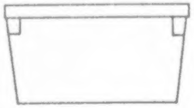

WHITE
(USEABLE)
B&R SHOVEL



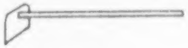
CLEAR
REWORK BINS

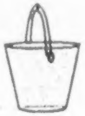

WHIITE AND
STAINLESS
SCOOPS

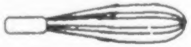
WHITE SCRUB
BRUSH

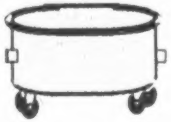

WHITE TUBS
FOR BUTTER

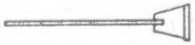
STAINLESS
BUTTER CUTTER

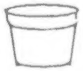

STAINLESS SCRAP
DOUGH RAKE

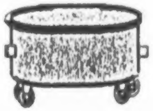

STAINLESS MINOR
INGREDIENT BUCKET


STAINLESS
WISP


STAINLESS
DOUGH / MEAL TROUGH


STAINLESS
PROOF ROOM
SCRAPER

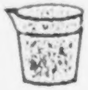

WHITE APRON
WATER BUCKET

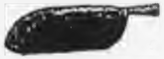

GREY USEABLE
B&R TROUGH

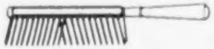
NABISCO
BRANDS INC

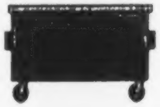
RICHMOND, VA BAKERY CONTAINERS

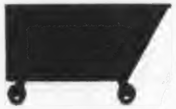
NON- FOOD CONTACT UTENSILS AND CONTAINERS

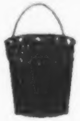

GREY CLEANING BUCKET

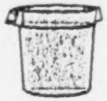

BLUE HOT MELT SCOOP

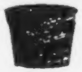

GREEN BRISTLED BAG BRUSH

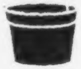

BROWN REFUSE CONTAINER

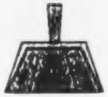

GREEN PAPER/SALT RECEPTACLE

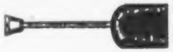

RED EH&S FLOOR WAX BUCKET


GREY 30/50 GAL TRASH CAN


GREEN WASTE OIL BUCKET

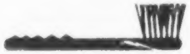

BLACK MOTOR OIL BUCKET

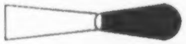

BROWN / BLUE DUST PAN


RED REFUSE B&R SHOVEL

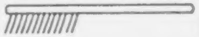
BLACK HANDLED BRUSH

BLACK SCRAPER

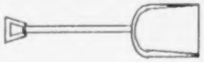

BLACK SCRUB BRUSH

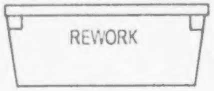

BLACK HANDLED SCRAPER

FOOD CONTACT UTENSILS AND CONTAINERS WHITE AND STAINLESS

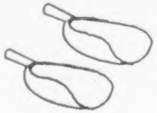

WHITE HANDLED BRUSH

WHITE SCRAPER


WHITE (USEABLE) B&R SHOVEL



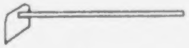
CLEAR REWORK BINS

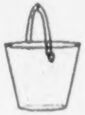

WHIITE AND STAINLESS SCOOPS

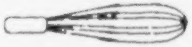
WHITE SCRUB BRUSH

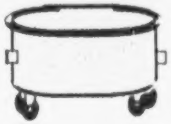
WHITE TUBS FOR BUTTER

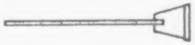
STAINLESS BUTTER CUTTER

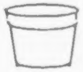

STAINLESS SCRAP DOUGH RAKE

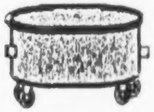

STAINLESS MINOR INGREDIENT BUCKET


STAINLESS WISP


STAINLESS DOUGH / MEAL TROUGH


STAINLESS PROOF ROOM SCRAPER

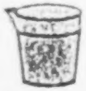

WHITE APRON WATER BUCKET


GREY USEABLE B&R TROUGH

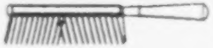
NABISCO
BRANDS INC

RICHMOND, VA BAKERY CONTAINERS

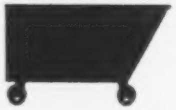
NON-FOOD CONTACT UTENSILS AND CONTAINERS

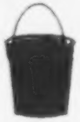

GREY CLEANING BUCKET

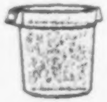
BLUE HOT MELT SCOOP


GREEN BRISTLED BAG BRUSH

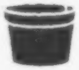
BROWN REFUSE CONTAINER

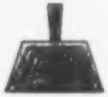

GREEN PAPER/SALT RECEPTACLE

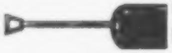

RED EH&S FLOOR WAX BUCKET


GREY 30/50 GAL TRASH CAN

GREEN WASTE OIL BUCKET


BLACK MOTOR OIL BUCKET

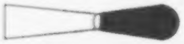

BROWN / BLUE DUST PAN


RED REFUSE B&R SHOVEL

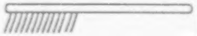
BLACK HANDLED BRUSH

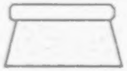
BLACK SCRAPER

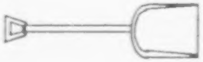
BLACK SCRUB BRUSH

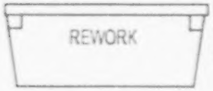

BLACK HANDLED SCRAPER

FOOD CONTACT UTENSILS AND CONTAINERS WHITE AND STAINLESS

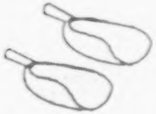

WHITE HANDLED BRUSH


WHITE SCRAPER

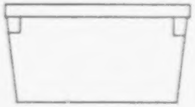

WHITE (USEABLE) B&R SHOVEL



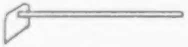
CLEAR REWORK BINS

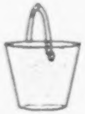

WHIITE AND STAINLESS SCOOPS

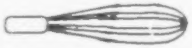
WHITE SCRUB BRUSH

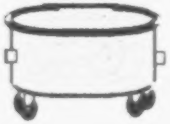

WHITE TUBS FOR BUTTER

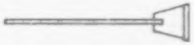
STAINLESS BUTTER CUTTER

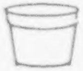

STAINLESS SCRAP DOUGH RAKE

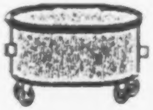

STAINLESS MINOR INGREDIENT BUCKET


STAINLESS WISP


STAINLESS DOUGH / MEAL TROUGH


STAINLESS PROOF ROOM SCRAPER

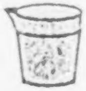

WHITE APRON WATER BUCKET

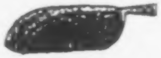

GREY USEABLE B&R TROUGH

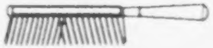
NABISCO
BRANDS INC

RICHMOND, VA BAKERY CONTAINERS

NON-FOOD CONTACT UTENSILS AND CONTAINERS

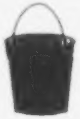

GREY CLEANING BUCKET

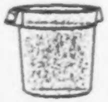

BLUE HOT MELT SCOOP

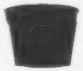

GREEN BRISTLED BAG BRUSH

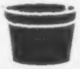
BROWN REFUSE CONTAINER

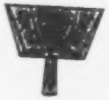
GREEN PAPER/SALT RECEPTACLE

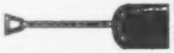

RED EH&S FLOOR WAX BUCKET

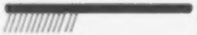

GREY 30/50 GAL TRASH CAN


GREEN WASTE OIL BUCKET


BLACK MOTOR OIL BUCKET

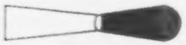

BROWN / BLUE DUST PAN


RED REFUSE B&R SHOVEL

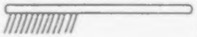

BLACK HANDLED BRUSH

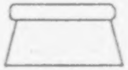
BLACK SCRAPER

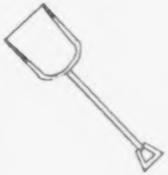
BLACK SCRUB BRUSH

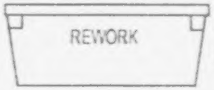

BLACK HANDLED SCRAPER

FOOD CONTACT UTENSILS AND CONTAINERS WHITE AND STAINLESS

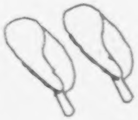

WHITE HANDLED BRUSH


WHITE SCRAPER

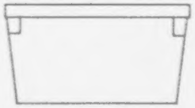

WHITE (USEABLE) B&R SHOVEL



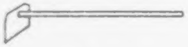
CLEAR REWORK BINS

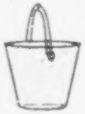

WHIITE AND STAINLESS SCOOPS

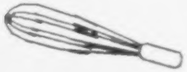
WHITE SCRUB BRUSH

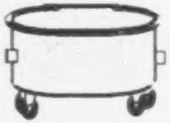

WHITE TUBS FOR BUTTER

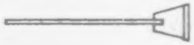
STAINLESS BUTTER CUTTER

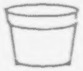

STAINLESS SCRAP DOUGH RAKE

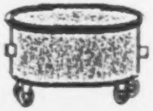

STAINLESS MINOR INGREDIENT BUCKET


STAINLESS WISP


STAINLESS DOUGH / MEAL TROUGH


STAINLESS PROOF ROOM SCRAPER

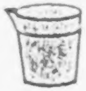

WHITE APRON WATER BUCKET

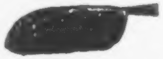

GREY USEABLE B&R TROUGH

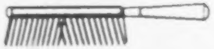
NABISCO
BRANDS INC

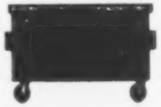
RICHMOND, VA BAKERY CONTAINERS

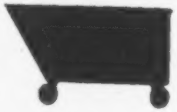
NON-FOOD CONTACT UTENSILS AND CONTAINERS

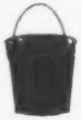

GREY CLEANING BUCKET

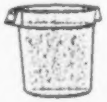

BLUE HOT MELT SCOOP


GREEN BRISTLED BAG BRUSH

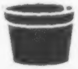

BROWN REFUSE CONTAINER

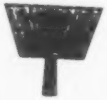

GREEN PAPER/SALT RECEPTACLE

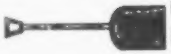

RED EH&S FLOOR WAX BUCKET


GREY 30/50 GAL TRASH CAN

GREEN WASTE OIL BUCKET


BLACK MOTOR OIL BUCKET

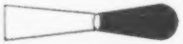

BROWN / BLUE DUST PAN


RED REFUSE B&R SHOVEL

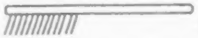
BLACK HANDLED BRUSH

BLACK SCRAPER

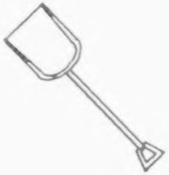
BLACK SCRUB BRUSH

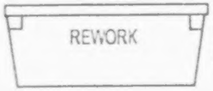

BLACK HANDLED SCRAPER

FOOD CONTACT UTENSILS AND CONTAINERS WHITE AND STAINLESS

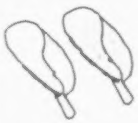

WHITE HANDLED BRUSH

WHITE SCRAPER

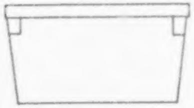

WHITE (USEABLE) B&R SHOVEL



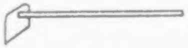
CLEAR REWORK BINS

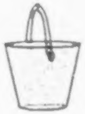

WHIITE AND STAINLESS SCOOPS

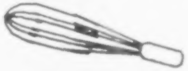
WHITE SCRUB BRUSH

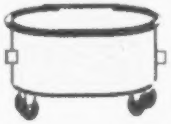

WHITE TUBS FOR BUTTER

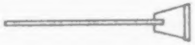
STAINLESS BUTTER CUTTER

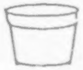

STAINLESS SCRAP DOUGH RAKE

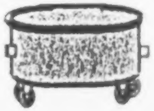

STAINLESS MINOR INGREDIENT BUCKET


STAINLESS WISP


STAINLESS DOUGH / MEAL TROUGH


STAINLESS PROOF ROOM SCRAPER

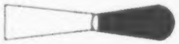

WHITE APRON WATER BUCKET

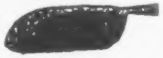

GREY USEABLE B&R TROUGH

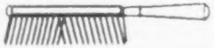
NABISCO
BRANDS INC

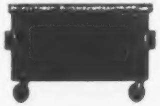
RICHMOND, VA BAKERY CONTAINERS

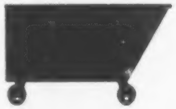
NON-FOOD CONTACT UTENSILS AND CONTAINERS

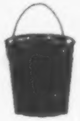

BLACK HANDLED SCRAPER

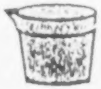

BLUE HOT MELT SCOOP

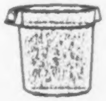

GREEN BRISTLED BAG BRUSH


BROWN REFUSE CONTAINER

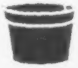

GREEN PAPER/SALT RECEPTACLE

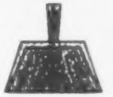

RED EH&S FLOOR WAX BUCKET

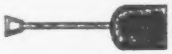

GREY CLEANING BUCKET

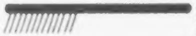

GREY 30/50 GAL TRASH CAN

GREEN WASTE OIL BUCKET

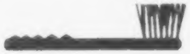

BLACK MOTOR OIL BUCKET

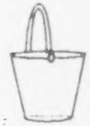

BROWN / BLUE DUST PAN


RED REFUSE B&R SHOVEL

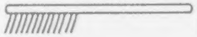

BLACK HANDLED BRUSH

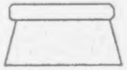
BLACK SCRAPER

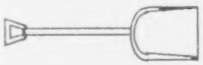

BLACK SCRUB BRUSH

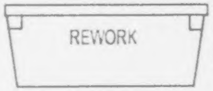

STAINLESS MINOR INGREDIENT BUCKET

FOOD CONTACT UTENSILS AND CONTAINERS WHITE AND STAINLESS

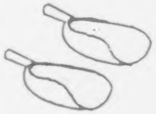

WHITE HANDLED BRUSH


WHITE SCRAPER


WHITE (USEABLE) B&R SHOVEL

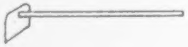


CLEAR REWORK BINS

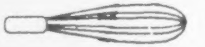

WHIITE AND STAINLESS SCOOPS

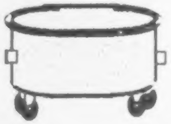
WHITE TUBS FOR BUTTER

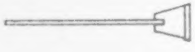
STAINLESS BUTTER CUTTER

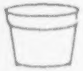

STAINLESS SCRAP DOUGH RAKE

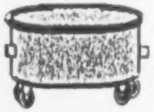
WHITE SCRUB BRUSH


STAINLESS WISP


STAINLESS DOUGH / MEAL TROUGH


STAINLESS PROOF ROOM SCRAPER

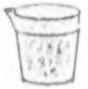

WHITE APRON WATER BUCKET


GREY USEABLE B&R TROUGH

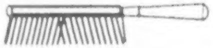
NABISCO
BRANDS INC

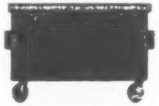
RICHMOND, VA BAKERY CONTAINERS

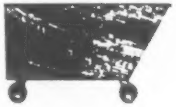
NON- FOOD CONTACT UTENSILS AND CONTAINERS

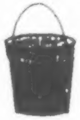

GREY CLEANING BUCKET

BLUE HOT MELT SCOOP

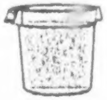

GREEN BRISTLED BAG BRUSH

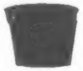

BROWN REFUSE CONTAINER

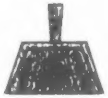

GREEN PAPER/SALT RECEPTACLE

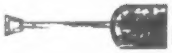

RED EH&S FLOOR WAX BUCKET

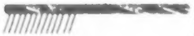
BLACK HANDLED SCRAPER


GREY 30/50 GAL TRASH CAN


GREEN WASTE OIL BUCKET

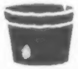

BROWN / BLUE DUST PAN


RED REFUSE B&R SHOVEL

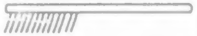

BLACK HANDLED BRUSH

BLACK SCRAPER

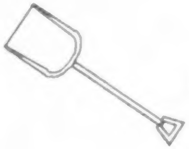
BLACK SCRUB BRUSH

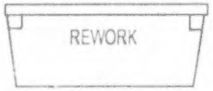

BLACK MOTOR OIL BUCKET

FOOD CONTACT UTENSILS AND CONTAINERS WHITE AND STAINLESS

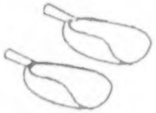

WHITE HANDLED BRUSH

WHITE SCRAPER

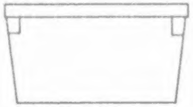

WHITE (USEABLE) B&R SHOVEL



CLEAR REWORK BINS

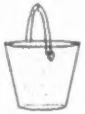

WHIITE AND STAINLESS SCOOPS

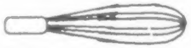
WHITE SCRUB BRUSH

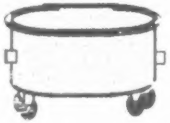

WHITE TUBS FOR BUTTER

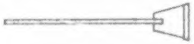
STAINLESS BUTTER CUTTER

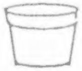
STAINLESS SCRAP DOUGH RAKE

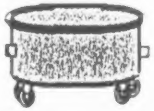

STAINLESS MINOR INGREDIENT BUCKET


STAINLESS WISP


STAINLESS DOUGH / MEAL TROUGH


STAINLESS PROOF ROOM SCRAPER


WHITE APRON WATER BUCKET


GREY USEABLE B&R TROUGH

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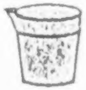
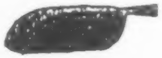
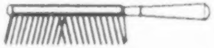
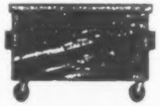
RICHMOND, VA BAKERY CONTAINERS

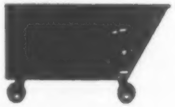
NON-FOOD CONTACT UTENSILS AND CONTAINERS

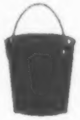

GREY CLEANING BUCKET

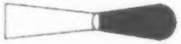

BLUE HOT MELT SCOOP

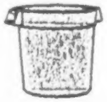

GREEN BRISTLED BAG BRUSH


BROWN REFUSE CONTAINER

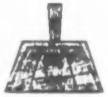

GREEN PAPER/SALT RECEPTACLE

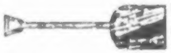

RED EH&S FLOOR WAX BUCKET

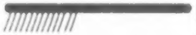

BLACK HANDLED SCRAPER


GREY 30/50 GAL TRASH CAN

GREEN WASTE OIL BUCKET

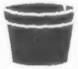

BROWN / BLUE DUST PAN


RED REFUSE B&R SHOVEL

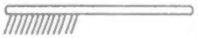

BLACK HANDLED BRUSH

BLACK SCRAPER

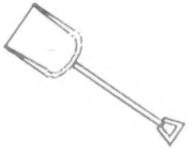
BLACK SCRUB BRUSH

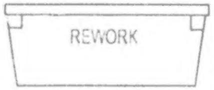

BLACK MOTOR OIL BUCKET

FOOD CONTACT UTENSILS AND CONTAINERS WHITE AND STAINLESS

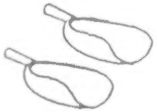

WHITE HANDLED BRUSH

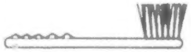
WHITE SCRAPER

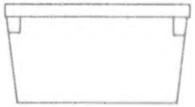

WHITE (USEABLE) B&R SHOVEL

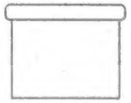


CLEAR REWORK BINS

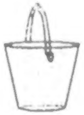

WHIITE AND STAINLESS SCOOPS

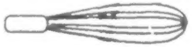

WHITE SCRUB BRUSH

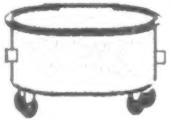

WHITE TUBS FOR BUTTER

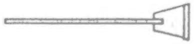

STAINLESS BUTTER CUTTER

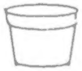
STAINLESS SCRAP DOUGH RAKE

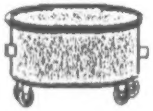

STAINLESS MINOR INGREDIENT BUCKET


STAINLESS WISP


STAINLESS DOUGH / MEAL TROUGH


STAINLESS PROOF ROOM SCRAPER

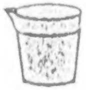

WHITE APRON WATER BUCKET

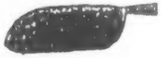

GREY USEABLE B&R TROUGH

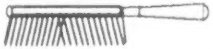
NABISCO
BRANDS INC

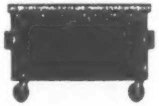
RICHMOND, VA BAKERY CONTAINERS

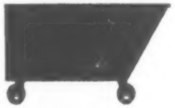
NON-FOOD CONTACT UTENSILS AND CONTAINERS

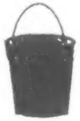

GREY CLEANING BUCKET

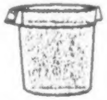

BLUE HOT MELT SCOOP

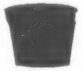

GREEN BRISTLED BAG BRUSH

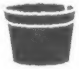

BROWN REFUSE CONTAINER

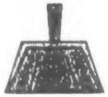

GREEN PAPER/SALT RECEPTACLE

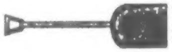

RED EH&S FLOOR WAX BUCKET

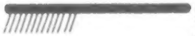

GREY 30/50 GAL TRASH CAN


GREEN WASTE OIL BUCKET


BLACK MOTOR OIL BUCKET

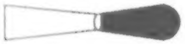

BROWN / BLUE DUST PAN


RED REFUSE B&R SHOVEL

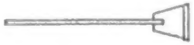

BLACK HANDLED BRUSH

BLACK SCRAPER

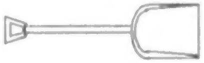
BLACK SCRUB BRUSH

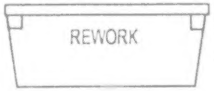

BLACK HANDLED SCRAPER

FOOD CONTACT UTENSILS AND CONTAINERS WHITE AND STAINLESS

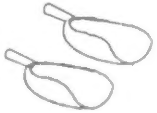

STAINLESS PROOF ROOM SCRAPER

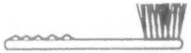
STAINLESS BUTTER CUTTER

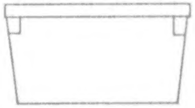

WHITE (USEABLE) B&R SHOVEL



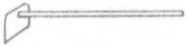
CLEAR REWORK BINS

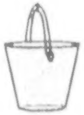

WHIITE AND STAINLESS SCOOPS

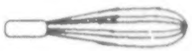

WHITE SCRUB BRUSH

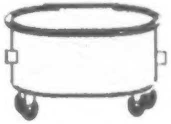

WHITE TUBS FOR BUTTER

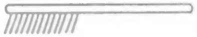
WHITE SCRAPER

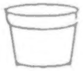

STAINLESS SCRAP DOUGH RAKE

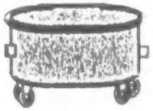

STAINLESS MINOR INGREDIENT BUCKET


STAINLESS WISP


STAINLESS DOUGH / MEAL TROUGH


WHITE HANDLED BRUSH

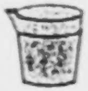

WHITE APRON WATER BUCKET

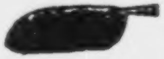

GREY USEABLE B&R TROUGH

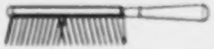
NABISCO
BRANDS INC

RICHMOND, VA BAKERY CONTAINERS

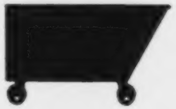
NON- FOOD CONTACT UTENSILS AND CONTAINERS

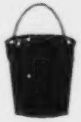

GREY CLEANING BUCKET

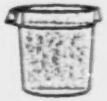

BLUE HOT MELT SCOOP


GREEN BRISTLED BAG BRUSH

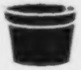
BROWN REFUSE CONTAINER

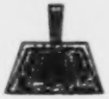

GREEN PAPER/SALT RECEPTACLE

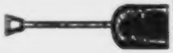

RED EH&S FLOOR WAX BUCKET

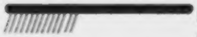

GREY 30/50 GAL TRASH CAN

GREEN WASTE OIL BUCKET

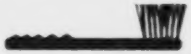

BLACK MOTOR OIL BUCKET

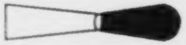

BROWN / BLUE DUST PAN


RED REFUSE B&R SHOVEL

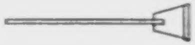

BLACK HANDLED BRUSH

BLACK SCRAPER

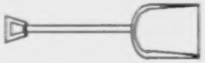

BLACK SCRUB BRUSH

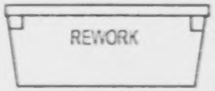

BLACK HANDLED SCRAPER

FOOD CONTACT UTENSILS AND CONTAINERS WHITE AND STAINLESS

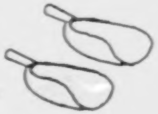

STAINLESS PROOF ROOM SCRAPER

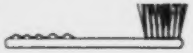
STAINLESS BUTTER CUTTER


WHITE (USEABLE) B&R SHOVEL

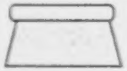


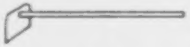
CLEAR REWORK BINS

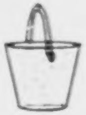

WHIITE AND STAINLESS SCOOPS

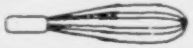

WHITE SCRUB BRUSH

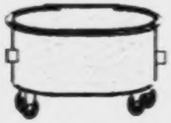
WHITE TUBS FOR BUTTER

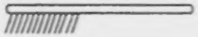

WHITE SCRAPER

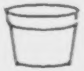

STAINLESS SCRAP DOUGH RAKE

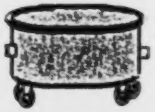

STAINLESS MINOR INGREDIENT BUCKET


STAINLESS WISP


STAINLESS DOUGH / MEAL TROUGH


WHITE HANDLED BRUSH

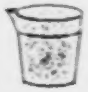

WHITE APRON WATER BUCKET

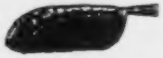

GREY USEABLE B&R TROUGH

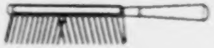
NABISCO
BRANDS INC

RICHMOND, VA BAKERY CONTAINERS

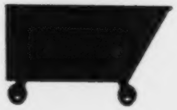
NON-FOOD CONTACT UTENSILS AND CONTAINERS

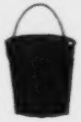

GREY CLEANING BUCKET


BLUE HOT MELT SCOOP

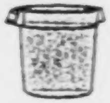

GREEN BRISTLED BAG BRUSH

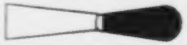
BROWN REFUSE CONTAINER

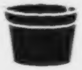

GREEN PAPER/SALT RECEPTACLE

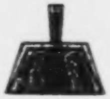

RED EH&S FLOOR WAX BUCKET

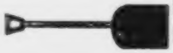
GREEN WASTE OIL BUCKET

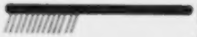

GREY 30/50 GAL TRASH CAN


BLACK HANDLED SCRAPER

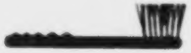

BLACK MOTOR OIL BUCKET


BROWN / BLUE DUST PAN

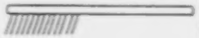

RED REFUSE B&R SHOVEL

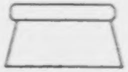

BLACK HANDLED BRUSH

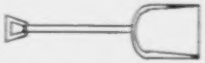
BLACK SCRAPER

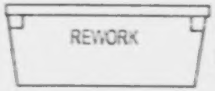

BLACK SCRUB BRUSH

FOOD CONTACT UTENSILS AND CONTAINERS WHITE AND STAINLESS

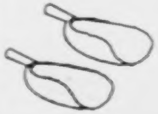

WHITE HANDLED BRUSH


WHITE SCRAPER


WHITE (USEABLE) B&R SHOVEL



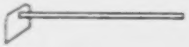
CLEAR REWORK BINS

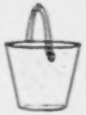

WHIITE AND STAINLESS SCOOPS

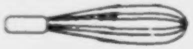
WHITE SCRUB BRUSH

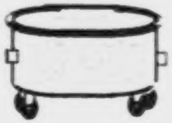
WHITE TUBS FOR BUTTER

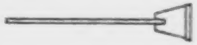
STAINLESS BUTTER CUTTER

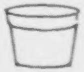

STAINLESS SCRAP DOUGH RAKE

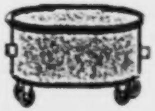

STAINLESS MINOR INGREDIENT BUCKET


STAINLESS WISP


STAINLESS DOUGH / MEAL TROUGH


STAINLESS PROOF ROOM SCRAPER

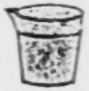

WHITE APRON WATER BUCKET

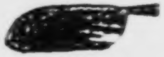

GREY USEABLE B&R TROUGH

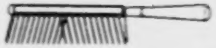
NABISCO
BRANDS INC

RICHMOND, VA BAKERY CONTAINERS

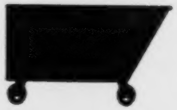
NON-FOOD CONTACT UTENSILS AND CONTAINERS

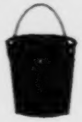

GREY CLEANING BUCKET


BLUE HOT MELT SCOOP

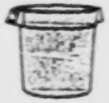

GREEN BRISTLED BAG BRUSH

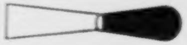
BROWN REFUSE CONTAINER

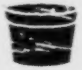

GREEN PAPER/SALT RECEPTACLE

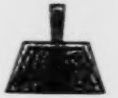

RED EH&S FLOOR WAX BUCKET

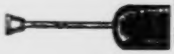
GREEN WASTE OIL BUCKET

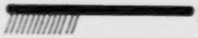

GREY 30/50 GAL TRASH CAN


BLACK HANDLED SCRAPER

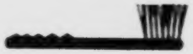

BLACK MOTOR OIL BUCKET


BROWN / BLUE DUST PAN

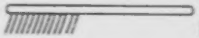

RED REFUSE B&R SHOVEL

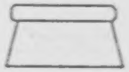

BLACK HANDLED BRUSH

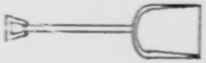
BLACK SCRAPER

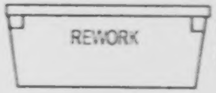

BLACK SCRUB BRUSH

FOOD CONTACT UTENSILS AND CONTAINERS WHITE AND STAINLESS

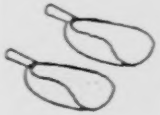

WHITE HANDLED BRUSH

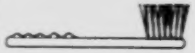

WHITE SCRAPER

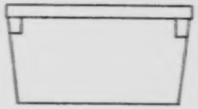

WHITE (USEABLE) B&R SHOVEL



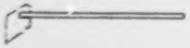
CLEAR REWORK BINS

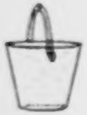

WHIITE AND STAINLESS SCOOPS

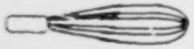

WHITE SCRUB BRUSH

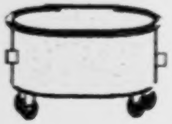

WHITE TUBS FOR BUTTER

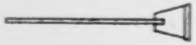
STAINLESS BUTTER CUTTER

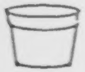

STAINLESS SCRAP DOUGH RAKE

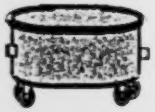

STAINLESS MINOR INGREDIENT BUCKET


STAINLESS WISP


STAINLESS DOUGH / MEAL TROUGH


STAINLESS PROOF ROOM SCRAPER


WHITE APRON WATER BUCKET


GREY USEABLE B&R TROUGH

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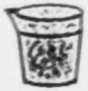
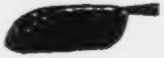
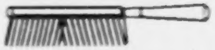
BRANDS INC

RICHMOND, VA BAKERY CONTAINERS

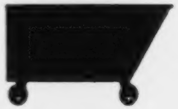
NON-FOOD CONTACT UTENSILS AND CONTAINERS

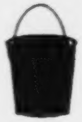

GREY CLEANING BUCKET

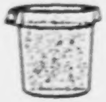

BLUE HOT MELT SCOOP


GREEN BRISTLED BAG BRUSH

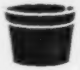
BROWN REFUSE CONTAINER

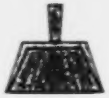

GREEN PAPER/SALT RECEPTACLE

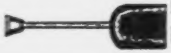

RED EH&S FLOOR WAX BUCKET

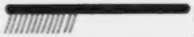

GREY 30/50 GAL TRASH CAN

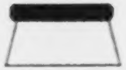
GREEN WASTE OIL BUCKET

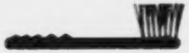

BLACK MOTOR OIL BUCKET

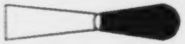

BROWN / BLUE DUST PAN


RED REFUSE B&R SHOVEL

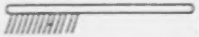

BLACK HANDLED BRUSH

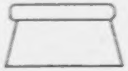

BLACK SCRAPER

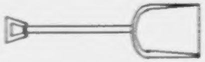

BLACK SCRUB BRUSH

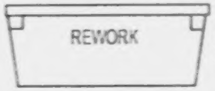

BLACK HANDLED SCRAPER

FOOD CONTACT UTENSILS AND CONTAINERS WHITE AND STAINLESS

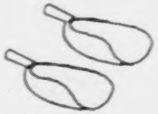

WHITE HANDLED BRUSH


WHITE SCRAPER

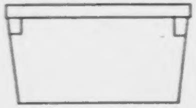

WHITE (USEABLE) B&R SHOVEL

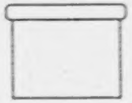


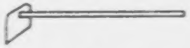
CLEAR REWORK BINS

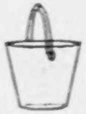

WHIITE AND STAINLESS SCOOPS

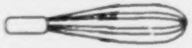
WHITE SCRUB BRUSH

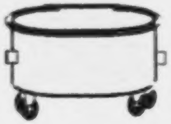

WHITE TUBS FOR BUTTER

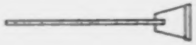

STAINLESS BUTTER CUTTER

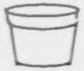

STAINLESS SCRAP DOUGH RAKE

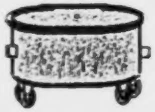

STAINLESS MINOR INGREDIENT BUCKET


STAINLESS WISP


STAINLESS DOUGH / MEAL TROUGH


STAINLESS PROOF ROOM SCRAPER


WHITE APRON WATER BUCKET


GREY USEABLE B&R TROUGH

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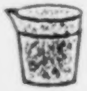
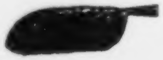
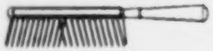
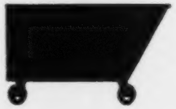
NON-FOOD CONTACT UTENSILS AND CONTAINERS

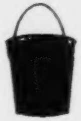

GREY CLEANING BUCKET

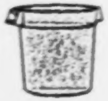

BLUE HOT MELT SCOOP


GREEN BRISTLED BAG BRUSH

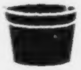
BROWN REFUSE CONTAINER

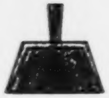

GREEN PAPER/SALT RECEPTACLE

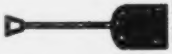

RED EH&S FLOOR WAX BUCKET


GREY 30/50 GAL TRASH CAN

GREEN WASTE OIL BUCKET


BLACK MOTOR OIL BUCKET

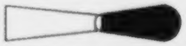

BROWN / BLUE DUST PAN


RED REFUSE B&R SHOVEL

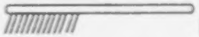
BLACK HANDLED BRUSH

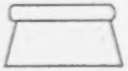
BLACK SCRAPER

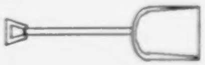
BLACK SCRUB BRUSH

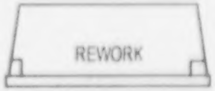

BLACK HANDLED SCRAPER

FOOD CONTACT UTENSILS AND CONTAINERS WHITE AND STAINLESS

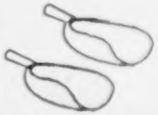

WHITE HANDLED BRUSH


WHITE SCRAPER

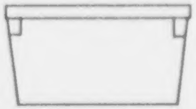

WHITE (USEABLE) B&R SHOVEL



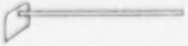
CLEAR REWORK BINS

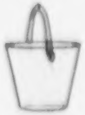

WHIITE AND STAINLESS SCOOPS

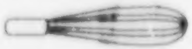
WHITE SCRUB BRUSH


WHITE TUBS FOR BUTTER

STAINLESS BUTTER CUTTER


STAINLESS SCRAP DOUGH RAKE


STAINLESS MINOR INGREDIENT BUCKET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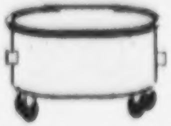
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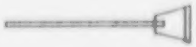
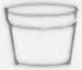
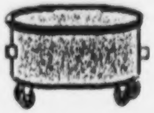

STAINLESS PROOF ROOM SCRAPER

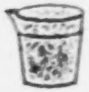

WHITE APRON WATER BUCKET


GREY USEABLE B&R TROUGH

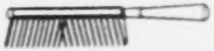
NABISCO
BRANDS INC

RICHMOND, VA BAKERY CONTAINERS

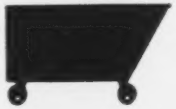
NON-FOOD CONTACT UTENSILS AND CONTAINERS

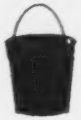

GREY CLEANING BUCKET

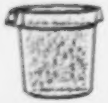
BLUE HOT MELT SCOOP


GREEN BRISTLED BAG BRUSH

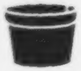
BROWN REFUSE CONTAINER

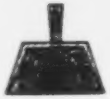

GREEN PAPER/SALT RECEPTACLE

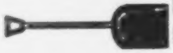

RED EH&S FLOOR WAX BUCKET

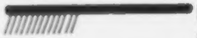

GREY 30/50 GAL TRASH CAN

GREEN WASTE OIL BUCKET


BLACK MOTOR OIL BUCKET

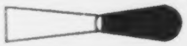

BROWN / BLUE DUST PAN


RED REFUSE B&R SHOVEL

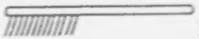

BLACK HANDLED BRUSH

BLACK SCRAPER

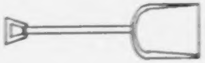
BLACK SCRUB BRUSH

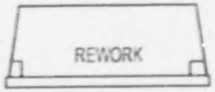

BLACK HANDLED SCRAPER

FOOD CONTACT UTENSILS AND CONTAINERS WHITE AND STAINLESS

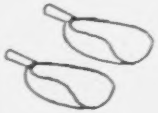

WHITE HANDLED BRUSH

WHITE SCRAPER


WHITE (USEABLE) B&R SHOVEL



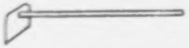
CLEAR REWORK BINS

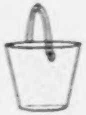

WHIITE AND STAINLESS SCOOPS

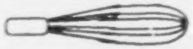
WHITE SCRUB BRUSH

WHITE TUBS FOR BUTTER

STAINLESS BUTTER CUTTER


STAINLESS SCRAP DOUGH RAKE


STAINLESS MINOR INGREDIENT BUCKET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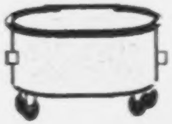
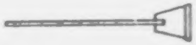
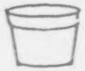
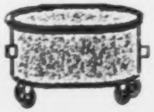

STAINLESS DOUGH / MEAL TROUGH


STAINLESS PROOF ROOM SCRAPER

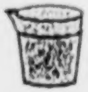

WHITE APRON WATER BUCKET


GREY USEABLE B&R TROUGH

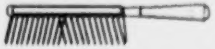
NABISCO
BRANDS INC

RICHMOND, VA BAKERY CONTAINERS

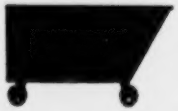
NON-FOOD CONTACT UTENSILS AND CONTAINERS

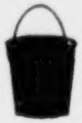

GREY CLEANING BUCKET

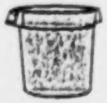
BLUE HOT MELT SCOOP


GREEN BRISTLED BAG BRUSH

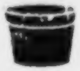
BROWN REFUSE CONTAINER


GREEN PAPER/SALT RECEPTACLE


RED EH&S FLOOR WAX BUCKET


GREY 30/50 GAL TRASH CAN

GREEN WASTE OIL BUCKET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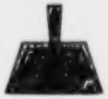
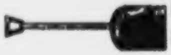

BROWN / BLUE DUST PAN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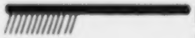
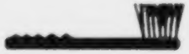
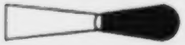
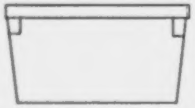

BLACK HANDLED BRUSH

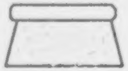
BLACK SCRAPER

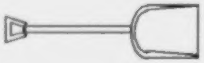

BLACK SCRUB BRUSH

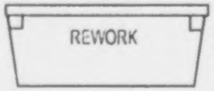

BLACK HANDLED SCRAPER

FOOD CONTACT UTENSILS AND CONTAINERS WHITE AND STAINLESS

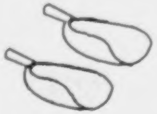

WHITE TUBS FOR BUTTER

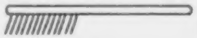

WHITE SCRAPER


WHITE (USEABLE) B&R SHOVEL



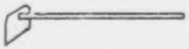
CLEAR REWORK BINS

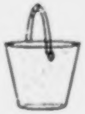

WHIITE AND STAINLESS SCOOPS

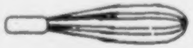

WHITE HANDLED BRUSH

WHITE SCRUB BRUSH

STAINLESS BUTTER CUTTER


STAINLESS SCRAP DOUGH RAKE


STAINLESS MINOR INGREDIENT BUCKET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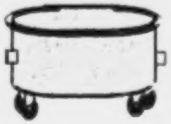
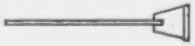
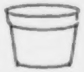
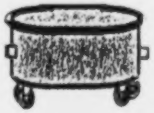

STAINLESS DOUGH / MEAL TROUGH


STAINLESS PROOF ROOM SCRAPER


WHITE APRON WATER BUCKET


GREY USEABLE B&R TROUGH

	Assembler			Mixer							Machine Captain				Baker	Machine Operator						Packing Technician						
Clusters	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Activities																												
MIN																												
Listening	■	■		■	■		■	■	■			■	■			■				■								
Reading	■	■			■	■		■	■	■	■	■	■					■	■	■	■				■		■	■
Graph Comp.				■	■					■			■															
Applied Math					■		■	■						■		■												
Problem ID	■			■	■	■	■	■	■													■						
Problem Solving			■			■		■		■	■							■	■									
MOD																												
Listening			■			■				■				■	■								■					
Reading			■	■										■								■	■			■		
Graph Comp.						■		■			■	■		■	■		■						■					
Applied Math	■	■		■						■		■					■	■				■	■	■				
Problem ID		■										■			■	■	■			■	■		■	■	■			
Problem Solving	■	■		■	■		■		■			■	■				■				■	■	■	■		■		■
MAX																												
Listening																												
Reading															■		■											
Graph Comp.																												
Applied Math													■		■													
Problem ID										■	■		■	■												■		
Problem Solving														■	■	■				■					■			
	Scaling	Dumping	All Assemblers	Computing Lay Time	Making New Dough	Monitoring Mixing	Adding Minor Ingre.	Checking Texture	Lines 5 & 7	Misc.: Mixer	Maintaining Work Area	Maintaining Thickness	Checking Dough Wt.	Maintaining Machine	Monitoring Oven Temp.	Loader (Platform)	East & West Line	Hourly Breakage Test	Hrly Sensory Test	Delkor Machine	Delkor Code Accuracy	Assessing Bagger Oper.	Checking Bag Wts.	Checking Bag Breakage.	Meyer System	Cartoner	Sensory Checks	Rotzinger

					Sanitor					Utility						Electrician				Mechanic			
Clusters	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51
Activities																							
MIN																							
Listening			■					■			■												
Reading	■		■	■	■			■									■						
Graph Comp.																■							
Applied Math					■						■	■											
Problem ID				■	■			■				■											
Problem Solving					■																		
MOD																							
Listening	■				■		■		■				■	■	■	■				■			
Reading		■					■						■	■	■	■							
Graph Comp.														■			■	■			■	■	■
Applied Math			■	■										■	■								
Problem ID							■				■						■		■				■
Problem Solving	■		■				■	■				■											
MAX																							
Listening						■				■							■	■	■				■
Reading						■			■	■	■	■						■	■	■	■	■	■
Graph Comp.										■										■			
Applied Math										■			■			■	■	■	■	■	■	■	■
Problem ID	■		■			■			■	■			■	■	■	■	■	■	■	■	■	■	■
Problem Solving		■	■	■		■			■	■	■		■	■	■	■	■	■	■	■	■	■	■
	Bundler	DMACS Computer	Start Up With Downloading	Downloading	Misc.: Sanitor	Hazardous Materials	Lockout	Wet Cleaning	Dry Cleaning	Misc.: Utility	Fumigating	Exhausting	Fogging	Phostoxins	Sifter Tailing	Construction	Preventive Maintenance	Troubleshooting	Misc.: Electrician	Monitoring	Troubleshooting	Maintenance	Misc.: Mechanic

REACH

Richmond Enhanced Academics for Change

Nabisco Richmond Model

Skills Effectiveness Training for Workplace Literacy: The Non-Intrusive Determination of Workplace Literacy Skills Requirements in a Union Environment

Participant Copy

Foreword

To the participant:

"But What Does This Have To Do With My Job"

There's a popular song about "Ever Changing Times" which could well be one of the theme songs for this modern era.

But as rapidly as our world is changing, one constant remains true - everyone needs a solid foundation of core skills to be able to function well on the job and in a fast-paced society.

Core skills (reading, math, communication, reasoning, problem solving) are transferrable skills. That means, once you learn them, you can apply those skills to almost any situation that requires those skills and have a good outcome.

Once you learn how to listen actively and ask questions about your job, you'll be able to apply those skills to any job.

Once you learn how to read a graph, you'll be able to read almost any graph. At the very least, your core knowledge of the concept of a graph will enable you to reason and think through an unfamiliar kind of graph with a good outcome.

The purpose of the REACH program is to enhance or strengthen the core literacy skills of the people who choose to participate in the program.

You may be able to see that some of the activities you're about to do relate directly to your workplace. You may not see the job relationship in other activities, but all of the activities have been designed around core skills that, once developed, can be applied to many different tasks in your workplace.

So, what does this have to do with your job? It has to do with strengthening your core skills so that your job skills will be easier to develop and build. It has to do with keeping you "out front" in the pursuit of the best possible product in these ever changing times.

Content Outline

Minimum Level Listening

1. Communicating with Co-Workers
    a. Recording Spoken Information
    b. Receiving Calls
    c. Asking Questions
    d. Notifying Others of Needs/Problems

2. Communicating with Supervisors

3. Communicating within a Work Group

Moderate Level Listening

4. Receiving Directions and Details
    a. Safety Meetings
    b. Following Oral/Auditory Directions
        (1.) Supervisory Instructions
        *(2.) Computer/Mechanical Alarms

Maximum Level Listening

5. Problem Identification/Troubleshooting
    a. Listening to people/Understanding complaints
    *b. Listening to things/detecting abnormal noises in machinery or equipment

6. Problem Solving

*on the job training

NABISCO®

The *REACH* Program

***R*ichmond**
***E*nhanced**
***A*cademics for**
***C*hange**
H

Part I - Listening Skills
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Capital Area Training Consortium
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Foreword

To the participant:

"But What Does This Have To Do With My Job"

There's a popular song about "Ever Changing Times" which could well be one of the theme songs for this modern era.

But as rapidly as our world is changing, one constant remains true - everyone needs a solid foundation of core skills to be able to function well on the job and in a fast-paced society.

Core skills (reading, math, communication, reasoning, problem solving) are transferrable skills. That means, once you learn them, you can apply those skills to almost any situation that requires those skills and have a good outcome.

Once you learn how to listen actively and ask questions about your job, you'll be able to apply those skills to any job.

Once you learn how to read a graph, you'll be able to read almost any graph. At the very least, your core knowledge of the concept of a graph will enable you to reason and think through an unfamiliar kind of graph with a good outcome.

The purpose of the REACH program is to enhance or strengthen the core literacy skills of the people who choose to participate in the program.

You may be able to see that some of the activities you're about to do relate directly to your workplace. You may not see the job relationship in other activities, but all of the activities have been designed around core skills that, once developed, can be applied to many different tasks in your workplace.

So, what does this have to do with your job? It has to do with strengthening your core skills so that your job skills will be easier to develop and build. It has to do with keeping you "out front" in the pursuit of the best possible product in these ever changing times.

Content Outline

Minimum Level Listening

1. Communicating with Co-Workers
    a. Recording Spoken Information
    b. Receiving Calls
    c. Asking Questions
    d. Notifying Others of Needs/Problems

2. Communicating with Supervisors

3. Communicating within a Work Group

Moderate Level Listening

4. Receiving Directions and Details
    a. Safety Meetings
    b. Following Oral/Auditory Directions
        (1.) Supervisory Instructions
        *(2.) Computer/Mechanical Alarms

Maximum Level Listening

5. Problem Identification/Troubleshooting
    a. Listening to people/Understanding complaints
    *b. Listening to things/detecting abnormal noises in machinery or equipment

6. Problem Solving

*on the job training

Activity: 1 - Find Your Twin

Objective(s): This activity will enable participants

1. To demonstrate ability to listen as distinguished from hearing.
2. To follow simple, oral directions.
3. To practice listening (especially interpretation and evaluation), speaking and analytical skills.
4. To practice observing detail in a simple schematic.
5. To practice translating observations into accurate descriptions.

Materials Required:
Ten sets of identical cards of a simple schematic (20 participants)

You need to know:

About Listening -

1. All jobs require good listening and speaking skills.
2. Hearing is sensing or receiving sound and recognizing it. It's physical!
3. Listening is hearing sound but also...
    - Interpreting the meaning of the sound and
    - Evaluating the sound and deciding how to use it and
    - Reacting to the sound based on what you heard and how you evaluated the sound.
4. The average listener remembers only about 50% - one-half of what he has heard 20 minutes after he has heard it!
5. If 100 million people make a listening mistake on their jobs each week and it costs $10 to correct or redo their work, American companies would spend an additional one billion dollars per week!

Activity 1 - Find Your Twin (continued)

Directions:

1. You will each be given a card with a drawing of a GMP board (Good Manufacturing Procedure) on it.

2. One, and only one, other participant will have a GMP board that is identical to yours in every detail.

3. By carefully analyzing all the details of your board and then milling around asking and answering comparison questions about your board with other participants find the twin for your board.

4. The person who has the twin picture of your board is going to be your partner for the next activity and so the two of you should sit down together.

5. You cannot look at another person's card until you are sure you have found a match. Analyze, ask questions and listen!

Activity: 2 - Getting To Know You

Objective(s): This activity will enable participants
1. To follow simple, oral directions.
2. To practice listening and speaking skills.
3. To practice short term memory skills.
4. To become familiar with other program participants.
5. To provide insight and familiarity for the facilitator.

Materials Required:
1. List of topics

You need to know:

About Speaking - In this era of increasing diversity, it's very important to understand that a person's cultural background as well as their gender and position has a lot to do with their verbal and nonverbal communication styles.

1. Nonverbal Skills or What Do You Look Like?
   These nonverbal speaking skills make up more than one half of the meaning in any message that's being sent.
   (a) Appearance
   (b) Body Language-communicates even when you don't mean to
      1. positive gestures-open palms, body leaning forward, relaxed appearance
      2. negative gestures-arms crossed, hands hidden or clenched, tense appearance
      3. distance, space and touching

2. Vocal Skills and Tone or What Do You Sound Like?

3. Verbal or Language Skills or What Do You Say?

Activity: 2 - Getting To Know You (continued)

Directions:

1. You and your partner will discuss the topics that will be read to you in a moment.

2. Use what you've learned about communicating through listening and speaking during this exchange.

3. Later, you and your partner will introduce each other to the rest of the group using only the information you've gained through this conversation.

4. No notes can be taken. Listen and stretch your memory! Mentally arrange the information about your partner in a way that will be easy for you to remember and retell.

5. The topics are:
THE NAME THEY PREFER TO BE CALLED-ONE NAME ONLY
THEIR FAVORITE NABISCO® PRODUCT - AS A CONSUMER
THE MOST INTERESTING PART OF THEIR PRESENT JOB
ONE OF THEIR JOB DUTIES THAT THEY KNOW THEY DO REALLY WELL
FIVE OTHER DUTIES OR RESPONSIBILITIES OF THEIR CURRENT JOB
ONE THING THEY WOULD CHANGE ABOUT THEIR PRESENT JOB IF THEY COULD.

Activity: 3 - The Communication Process

Objective(s): This activity will enable participants

1. To practice listening skills, as they draw according to simple, oral directions.
2. To learn communication concepts.
3. To develop their analytical skills.

Materials Required:
Pencil or Pen

You need to know:

About The Communication Process -
Everything we do is communication. And everything we do to communicate is done either to give or get information, to control, to follow social rules, or to share feelings. The complete communication process is a closed loop which starts when a sender wants to send a message to a receiver using whatever means is appropriate and available to him. The process ends with the positive feedback that the message was received and understood.

1. Sender - the person who has information to communicate to another person.
2. Message - the actual facts or information that are communicated.
3. Receiver - the person who receives the message and responds with feedback.
4. Feedback - everything that is sent back to the sender of the message that indicates that the message was received.
5. Channel or means - the method of communication. For example, the telephone, a meeting, smoke signals, body language, etc.

Activity: 3 - The Communication Process Model

Activity: 3 - The Communication Process (continued)

Directions:

1. On the opposite page, in the middle of the first blank space, draw a circle about 3 inches wide. It's okay that the circle is not perfectly round.
2. Outside the circle at the 12 o'clock position, write the word Sender.
3. Outside the circle at the 3 o'clock position, write the word Message.
4. Outside the circle at the 6 o'clock position, write the word Receiver.
5. Outside the circle at the 9 o'clock position, write the word Feedback.
6. Now, you have a closed loop model to use as you proceed with breaking down recent communications you've had into their parts.
7. Draw another circle in the next blank space and fill in this model with the names and one of the messages from a conversation you had today with your partner.
8. Now, in the last two spaces, draw a model for two recent work situations. One model should be of you sending a message and one model should be of you receiving a message. It's okay to use non-verbal messages. Just tel us what the communication channel was.
9. We'll discuss some of these later.

Activity: 4 - Workplace Communication Problems

Objective(s): This activity will enable participants

1. To gain and practice communication barrier concept skills.
2. To develop minimum level reading and writing skills.
3. To develop and practice analytical skills.

Materials Required:
Pencil or pen

You need to know:

About Barriers in Effective Workplace Communication

1. Sender Barriers
   - -Deadlines
   - -Personal biases - expressing an opinion as if it were fact
   - -Faulty assumptions - assuming that the receiver knows more than he actually does know
   - -Ignoring or misinterpreting the receiver's feedback

2. Receiver Barriers
   - -Deadlines
   - -Attitudes
   - -Personal Biases or Perceptions

   The attitudes and perceptions of people have a lot to do with communication. Perception refers to how you see things and what your senses tell you so that what you see and hear makes sense to you. Sometimes people hear what they want to hear rather than what was really said. How you perceive or see or hear other people and their communications is a result of many factors:
   1. the physical differences between you and the person.
   2. the differences in your past experiences and backgrounds.
   3. the differences in the language used.
   4. the setting in which you're communicating.
   5. how you feel at the time of the communication.

Activity: 4 - Workplace Communication Problems (continued)

You need to know: (continued)

3. Message Barriers
   - -Inaccurate or incomplete information
   - -Inappropriate words
   - -Environmental noise
   - -Sloppy handwriting or typing
   - -Torn or dirty pages of printed material

You need to know:

Ways to Overcome Workplace Communication Barriers

If you are a sender	If you are a receiver
1. Organize your thoughts and the information before sending the message.	1. Listen carefully for key words.
2. Send complete and accurate information.	2. Ask questions if you don't understand completely.
3. Use clear language.	3. Set realistic deadlines.
4. Stay calm and, if possible, get away from noise and distractions.	4. Listen with an open mind.
5. Set realistic deadlines.	
6. Ask for and listen to the receiver's feedback.	

Total Group
Listening

Activity: 4 - Workplace Communication Problems

Problem 1	Problem 2
Sender-	
Message-	
Receiver-	
Barriers-	
Problems-	
Solutions-	

Activity: 4 - Workplace Communication Problems (continued)

Directions:

1. As a group, we will analyze a workplace communication problem about notifying others of the needs, problems or current status of an assignment station.

2. We will follow the order of the chart on the opposite page as we discuss this problem (Problem 1). You make take notes if you'd like.

3. Afterwards, think about a workplace communication problem that you have been a part of or have witnessed.

4. Fill in Problem 2 on the chart with your workplace communication problem.

Activity: 5 - Active Listening and Removing Barriers Role Play

Objective(s): This activity will enable participants

1. To practice all the listening and speaking skills learned at this point.
2. To demonstrate an understanding of the consequences of ineffective communication (e.g. lost time, sub-standard product, etc.).
3. To demonstrate an understanding of the basic elements of effective communication.

Materials Required:
None

You need to know:

About Active Listening v. Passive Listening

Active Listening is a way of getting the sender of a message more involved with the receiver of a message. It helps everyone get the feedback and the answers they need. It is necessary for good two-way communication and for problem solving.

To get the right message, the receiver feeds the message back to the sender without adding anything to the message. It shows that the receiver has heard the message that is intended whether he agrees with the message or not. The sender will usually agree with the feedback or will send a new message that clarifies what he meant. Active listening is useful for decoding messages or getting at the hidden meanings in messages.

Activity: 5 - Active Listening and Removing Barriers Role Play (continued)

You need to know: (continued)

Steps in Active Listening

1. The sender sends a coded message.
2. The receiver receives the message.
3. The receiver decodes the message.
4. The receiver feeds back what the message is - nothing more or less - with no evaluations.
5. The sender either agrees with the receiver's interpretation or, if not, starts the message over again, clarifying the message and most likely revealing at least some of the hidden meanings in the message.

Passive Listening is the process of quietly taking in the statements and questions of the sender of a message. There is no feedback indicating that the message was received or understood.

Techniques for Listening Effectively

1. Prepare to listen by minimizing distractions and making eye contact with the sender when possible.
2. Know why and what you're listening for. What is the central idea being expressed and what are the important details?
3. Learn to recognize the ways most senders organize the information they're communicating -
    a. Chronological order - first, next, then
    b. Order of importance - most important, least significant, highest priority
    c. Comparison and contrast - like, different, in contrast, same
    d. Cause and effect - because, so, therefore
4. Look for nonverbal signals and try to determine what they mean.
5. Try to listen with an open mind even when the ideas are new and/or you don't agree with them.
6. Know yourself and your listening style. Make your style work for you or improve your listening style where necessary.

Activity: 5 - Active Listening and Removing Barriers Role Play (continued)

Directions:

1. You and your partner will develop a role play situation for a workplace communication problem that each of you has been a part of or witnessed.
2. Take turns being yourself in one role play and being the other person for your partner in another role play.
3. Nothing has to be written down.
4. Develop a "before" effective communication version of the role play and an "after" effective communication version of the same situation. In between the two versions, briefly discuss what you think were the reasons for and the consequences of the miscommunication.
5. You and your partner should be prepared to present your role plays (no more than 3 minutes each) to the entire group.

Activity: 6 - Listening Practice

Objective(s): This activity will enable participants
1. To develop listening skills through practice.
2. To practice recording spoken information.
3. To practice remembering oral details.

Materials Required:
1. Teacher-dictated listening practice materials
2. Participant worksheets and pencil

Directions:

1. This is a practice exercise, not a test. RELAX!

2. Do your best.

3. We'll discuss problem areas when we're done.

4. Listen carefully to the directions for each exercise.

Activity: 6 - Listening Practice Worksheet

a. Make a ✓ on the number you hear.

a. 10 11 100 b. 12 20 22 c. 3 13 30

d. 4 14 40 e. 5 15 50 f. 6 16 60

g. 7 17 70 h. 8 18 80 i. 9 19 90

b. Make a ✓ when you hear **like**.
Make an **x** when you hear **don't like**.

	Overtime	**Computers**	**Saturday Clean-Up**	**Monday Start-Up**
Ann				
Bob				
John				
Mary				

c. Listen and circle the number you hear:

555-4212	555-4202
311-9762	311-9752
254-8976	254-9976
778-2056	778-2046
626-5339	636-5339
255-9509	251-9509
782-8886	872-8886
874-0402	874-0482

Activity: 6 - Listening Practice Worksheet

d. Listen and write the missing numbers.

7_____ _____-8524

928-_____ _____34

413-25_____ _____

_____ _____5-7160

753-_____ _____42

835-27_____ _____

6_____ _____-7045

591-_____ _____38

e. Listen and write the lot ID number you hear.

____

____

____

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____

____

Total Group
Listening

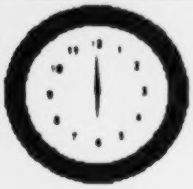
Activity: 6 - Listening Practice Worksheet

f. Listen and circle the number you hear:

1%	.1%	.01%	10%
2%	20%	.2%	.02%
3%	30%	.3%	.03%
40%	4%	.4%	.04%
50%	5%	.5%	.05%
60%	6%	.6%	.06%
70%	7%	.7%	.07%
80%	8%	.8%	.08%
90%	9%	.9%	.09%

Activity: 6 - Listening Practice Worksheet

g. Listen and identify the time you hear.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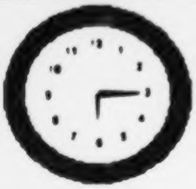
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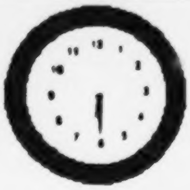
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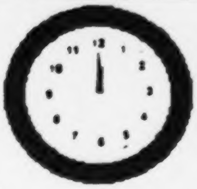
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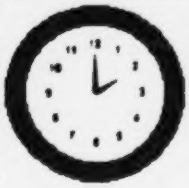
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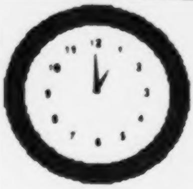
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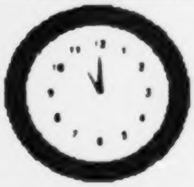
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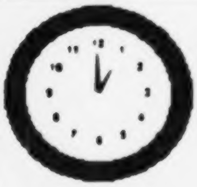
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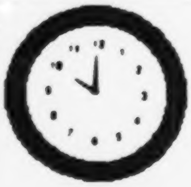
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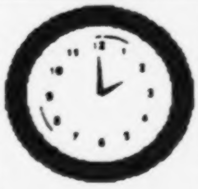
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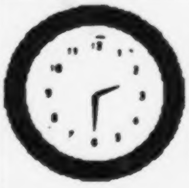
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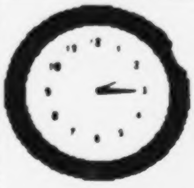
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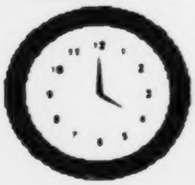
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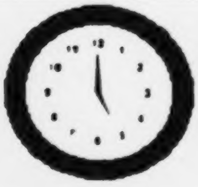
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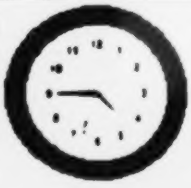
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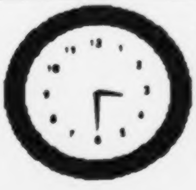
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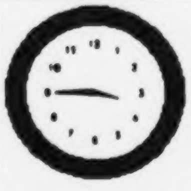
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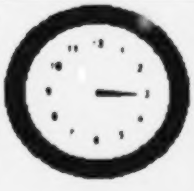
6. c

Total Group
Listening

Activity: 6 - Listening Practice Worksheet

h. Listen and circle the address you hear.

1.	655 Broad Street	665 Broad Street
2.	82 East Avenue	83 East Avenue
3.	428 Pine Street	448 Pine Street
4.	144 Brook Road	1404 Brook Road
5.	139 Lake Avenue	129 Lake Avenue
6.	5206 Main Street	5026 Main Street
7.	5790 Plum Street	5719 Plum Street
8.	4304 Laburnum Avenue	434 Laburnum Avenue

i. Listen and write the missing numbers.

1. 3 ___ ___ Franklin Street
2. 12 ___ ___ Carolina Avenue
3. ___ ___1 Bay Road
4. ___ ___68 Grand Avenue
5. 76 ___ ___ First Street
6. 5 ___ ___ River Road
7. ___ ___ 92 Madison Avenue
8. 2 ___ ___ Penny Lane

Activity: 6 - Listening Practice Worksheet

j. Listen and write the number you hear.

1. **work order number** ____________________
2. **lot ID** ____________________
3. **extension** ____________________
4. **assignment stations** ____________________
5. **a salt reading of** ____________________
6. **a dough temperature of** ____________________

k. Food Order Dictation

Take notes as needed to help you remember the items.
Visualize each item as you hear it.

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Activity: 6 - Listening Practice Worksheet

I. Granola Recipe

Take notes as needed to help you remember the recipe accurately.

Activity: 6 - Listening Practice Worksheet

m. **Listen carefully to the dictation on hearing protection.**
Later, you will answer questions by filling in the blanks below with the letter o
the correct type of hearing protection.

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a. Disposable Plugs

b. Reusable Plugs

c. Muffs

Activity: 6 - Listening Practice Worksheet

n. Directions for Surviving a Hotel Room Fire

Jot down only the key words you need to remember the directions you'll hear. Try to group the items in a way that makes sense to you - similar topics (using the phone), order of importance, etc. Try to picture these directions in your minds eye.

Activity: 6 - Listening Practice Worksheet

o. **Directions for Emergency Medical Care at Nabisco.®**
Again, jot down only the key words you need to remember the directions you'll hear. Try to group the items in a way that makes sense to you and that will be easy for you to remember.

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Activity: 6 - Listening Practice Worksheet

p. **Listen carefully to the newspaper article about a bakery.** Try to remember as many facts as you can. Also, listen for the main ideas and for the order of the production process. Be prepared to answer questions on the article. You may take notes as you'd like.

Article reprinted with permission of *Richmond Times Dispatch*, 1994

Activity: 6 - Listening Just For Fun

q. "Once upon a time there were four people named Everybody, Somebody, Nobody and Anybody. When there was an important job to be done, Everybody was sure that Somebody would do it. Anybody could have done it, but Nobody did it.

"When Nobody did it, Everybody got angry because it was Everybody's job. Everybody thought that Somebody would do it, but Nobody realized that Nobody would do it.

"So it ended up that Everybody blamed Somebody when Nobody did what Anybody could have done in the first place."

Activity: 7 - Giving and Following Oral Directions

Objective(s): This activity will enable participants

1. To develop an appreciation for the skills involved in giving and following oral directions.
2. To practice giving and following oral directions.
3. To develop analytical skills.
4. To reinforce listening and speaking skills.

Materials Required:

1. Two different graphic designs
2. Blank paper, pencils

You need to know:

About Following Oral Directions

1. Use active listening to follow directions. To listen actively, you must
   - Give the sender your full attention and plan what you are going to do.
   - Check to be sure that you understand the directions.
   - Clarify the task that you are to do by getting more information if needed.

2. Plan the task
   - Pay attention to key words in the directions.
   - Pay attention to the order or sequence of the directions.
   - Picture yourself carrying out the directions as they are told to you.
   - Think as the sender is talking and recreate the directions in your mind.

3. Check your understanding
   When the directions have been given, check your understanding by
   - summarizing the directions
   - asking questions if necessary

Activity: 7 - Giving and Following Oral Directions (continued)

You need to know: (continued)

About Giving Oral Directions

1. Know the correct process for completing a task yourself. The people who know what they are talking about are the people who are best able to give good directions.
2. Plan exactly what you're going to say as you give the directions. Put the steps in order.
3. Think about what materials or equipment are needed to complete the task accurately.
4. Think about the receivers of your directions. Don't talk down to the receivers but don't assume that they know more than they do.
5. If completing the task involves any personal safety issues or risk of equipment damage, it's important to include precautions in your directions.
6. Check the receiver's understanding of your directions by asking him to repeat the directions or whether he has any questions.
7. Clarify your directions if the receiver is confused and unsure of what to do. Try to understand what might be leading to the confusion.

Activity: 7 - Giving and Following Oral Directions (continued)

Directions:

1. You and your partner will take turns giving and following oral directions from each other.

2. One of you should sit down with a blank sheet of paper. Your job is to draw the picture that your partner directs you to draw.

3. The other one of you will be given the picture. Your task is to explain to your partner how to draw this picture.

4. You may not rehearse.

5. You may not show the picture.

6. You may not use any visual aids.

7. You must keep your hands at your sides.

   The object is for your partner to have a picture exactly like yours when the exercise is completed.

   When you are through, discuss the experience with your partner. Analyze what made the task so difficult. What would the two of you suggest to make the task easier and to achieve a better result?

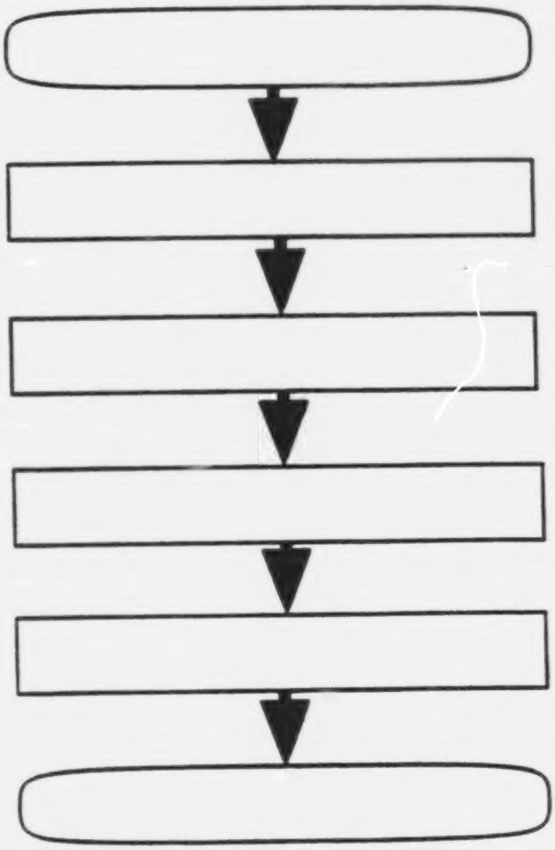
8. Now, switch roles. You will be given another picture to direct.

Task: how to

Words to explain:

Materials needed:

Main steps in performing the task:



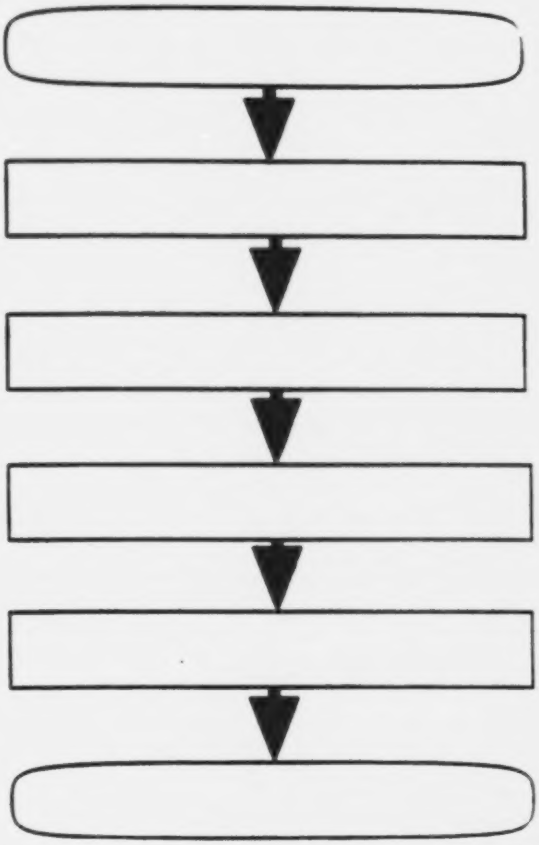
Safety Warnings:

Task: how to

Words to explain:

Materials needed:

Main steps in performing the task:



Safety Warnings:

Activity: 8 - Planning for and Giving Oral Directions

Objective(s): This activity will enable participants
1. To develop analytical skills.
2. To reinforce all of the communication concepts to date through practice.
3. To develop minimum level reading and writing skills.
4. To develop skill in sequencing instructions.
5. To practice giving and following oral directions.

Materials Required:
1. Planning forms
2. Pencil
3. Any task materials brought by participants

Directions:

1. You and your partner were previously asked to come prepared to direct each other on a simple task from your everyday life and from your work life.

2. Use the planning form on the opposite page to help you organize your thoughts as you prepare to teach your partner these tasks.

3. When both of you are ready, take turns with your partner giving and listenin to oral directions.

Activity: 9 - Sequencing Oral Directions

Objective(s): This activity will enable participants
1. To develop skill in sequencing instructions.
2. To develop analytical skills.

Materials Required:
1. Set of emergency evacuation diagrams of Nabisco facility.

Directions:

1. Study the set of diagrams on the following pages and find your work station at Nabisco.

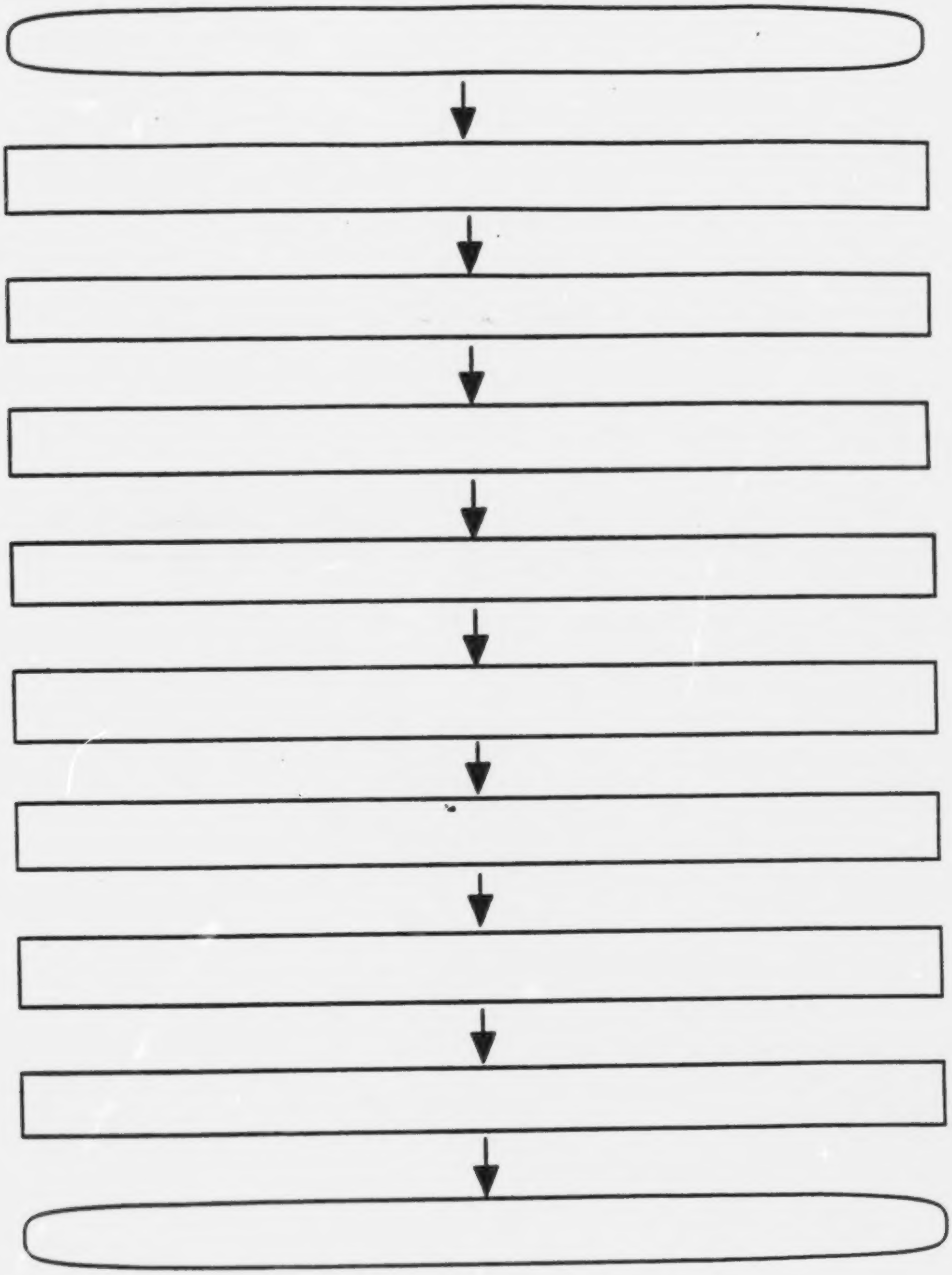
2. Mentally plan how to give directions for evacuating the plant from your work station. Try to envision the route you should take.

3. Fill in the flow chart on the next page with directions for evacuating your work station in an emergency.

4. Be prepared to give your directions orally to other participants.

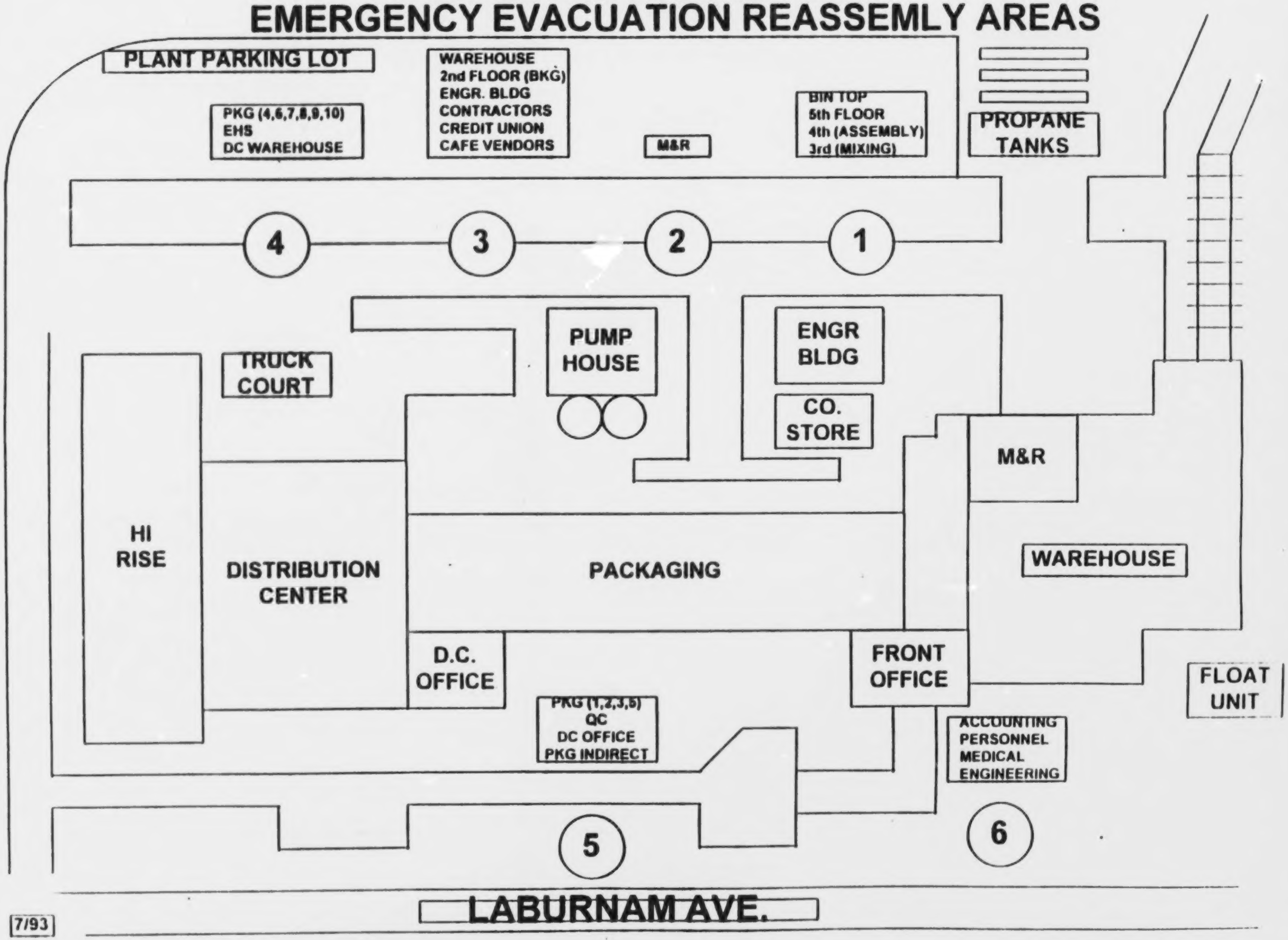
Total Group
Listening

Activity: 9 - Sequencing Oral Directions
Flow Chart

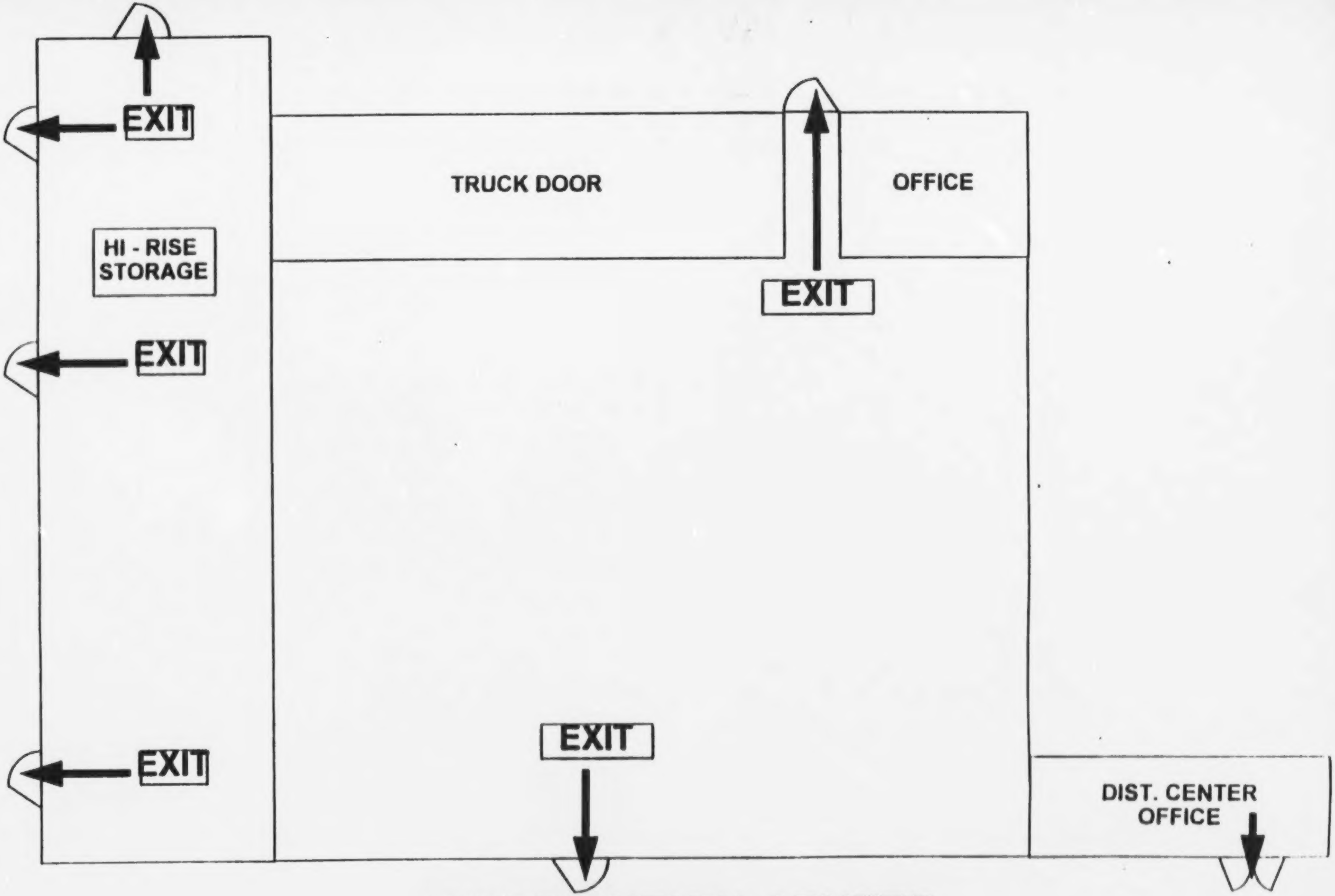


NABISCO, INC. RICHMOND BAKERY / D.C.

EMERGENCY EVACUATION REASSEMLY AREAS

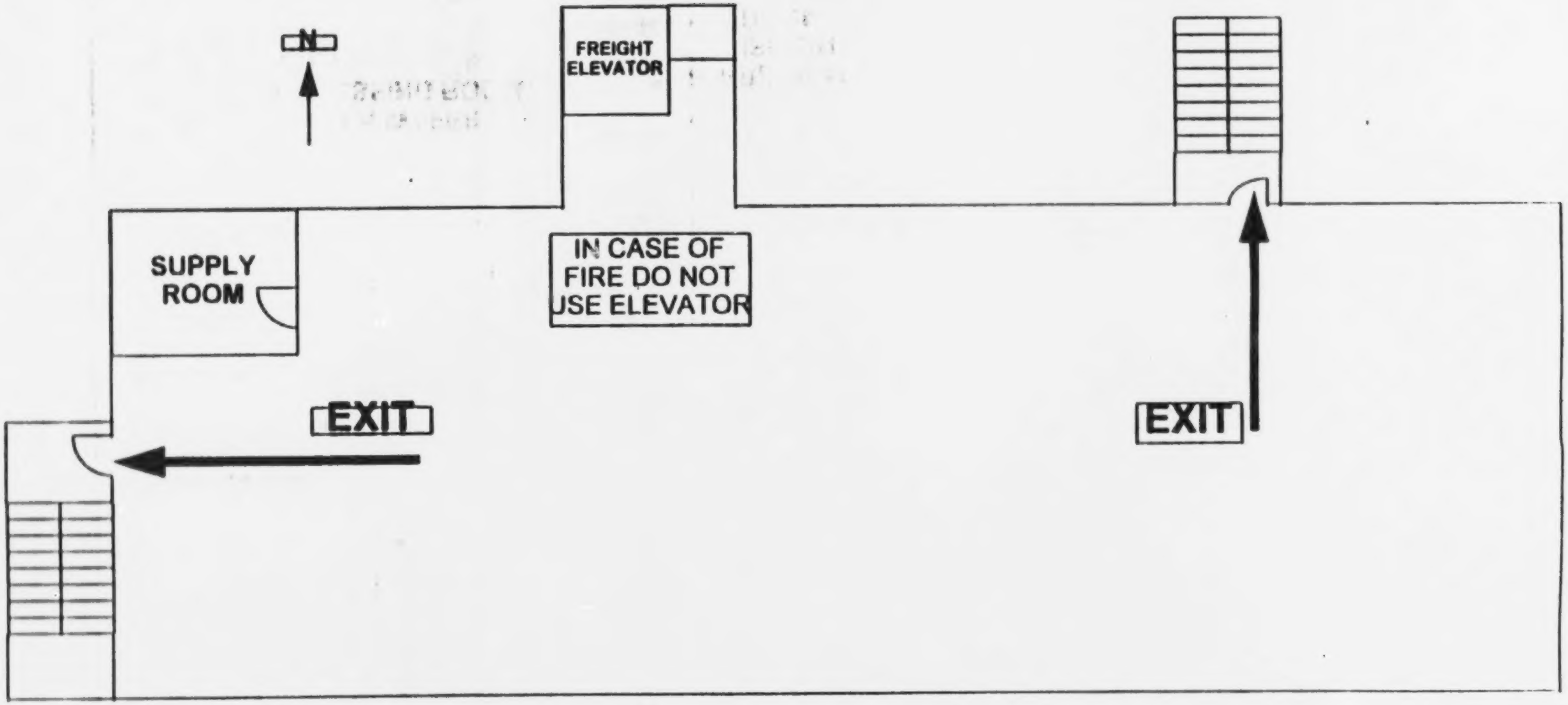

PLANT PARKING LOT
PKG (4,6,7,8,9,10)
EHS
DC WAREHOUSE
WAREHOUSE
2nd FLOOR (BKG)
ENGR. BLDG
CONTRACTORS
CREDIT UNION
CAFE VENDORS
M&R
BIN TOP
5th FLOOR
4th (ASSEMBLY)
3rd (MIXING)
PROPANE TANKS
4
3
2
1
PUMP HOUSE
ENGR BLDG
CO. STORE
TRUCK COURT
HI RISE
DISTRIBUTION CENTER
PACKAGING
M&R
WAREHOUSE
D.C. OFFICE
FRONT OFFICE
FLOAT UNIT
PKG (1,2,3,5)
QC
DC OFFICE
PKG INDIRECT
ACCOUNTING
PERSONNEL
MEDICAL
ENGINEERING
5
6
LABURNAM AVE.

7/93


EXIT
TRUCK DOOR
OFFICE
HI - RISE STORAGE
EXIT
EXIT
EXIT
EXIT
EXIT
DIST. CENTER OFFICE

DISTRIBUTION CENTER

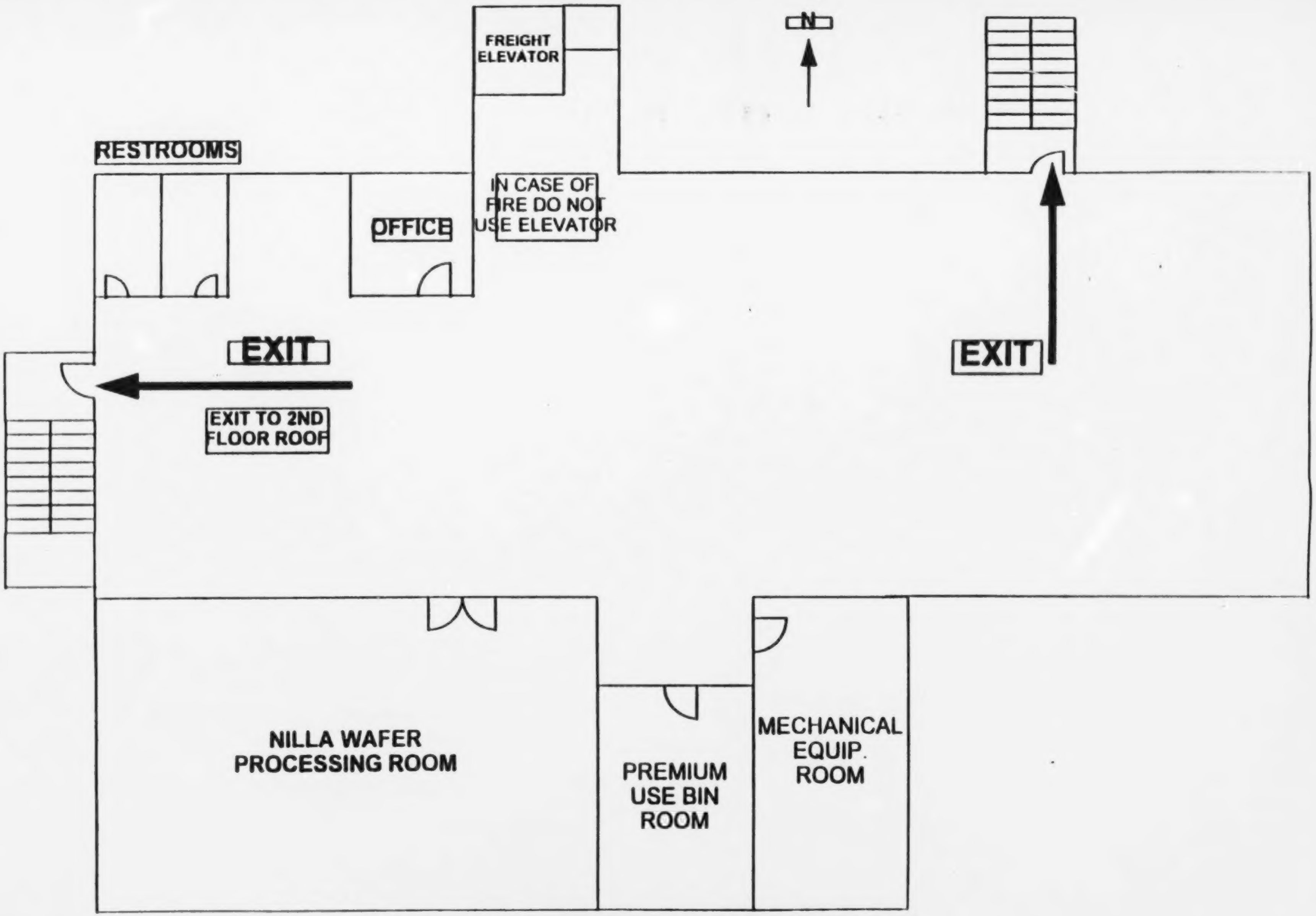
7/93 731 NABISCO, BRANDS RICHMOND BAKERY / D.C. 732


N
FREIGHT ELEVATOR
IN CASE OF FIRE DO NOT USE ELEVATOR
SUPPLY ROOM
EXIT
EXIT

5TH FLOOR - USE BIN AREA

NABISCO, INC. RICHMOND BAKERY / D.C.

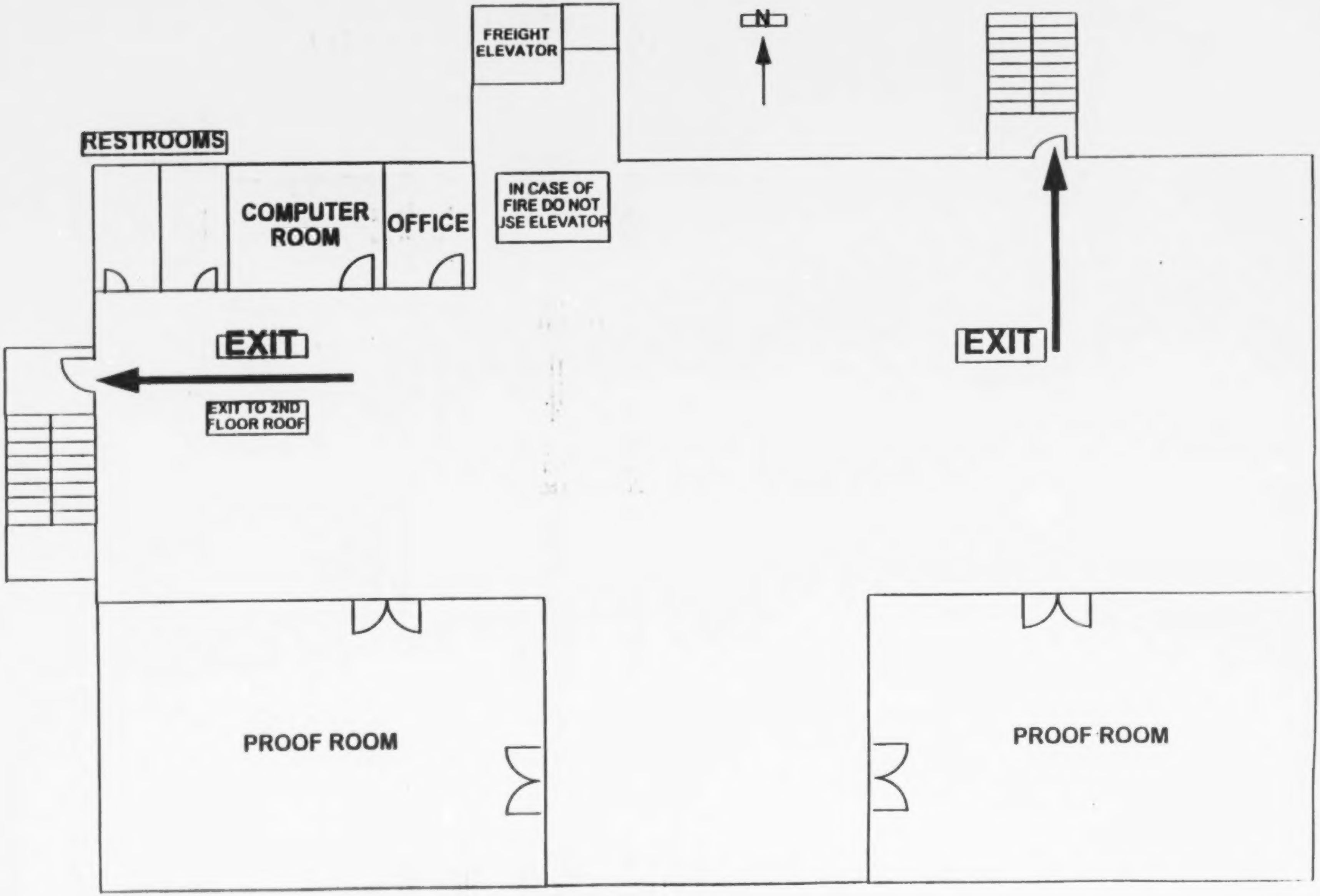
7/93


FREIGHT ELEVATOR
N
RESTROOMS
OFFICE
IN CASE OF FIRE DO NOT USE ELEVATOR
EXIT
EXIT
EXIT TO 2ND FLOOR ROOF
NILLA WAFER PROCESSING ROOM
PREMIUM USE BIN ROOM
MECHANICAL EQUIP. ROOM

4TH FLOOR - ASSEMBLY

7/93

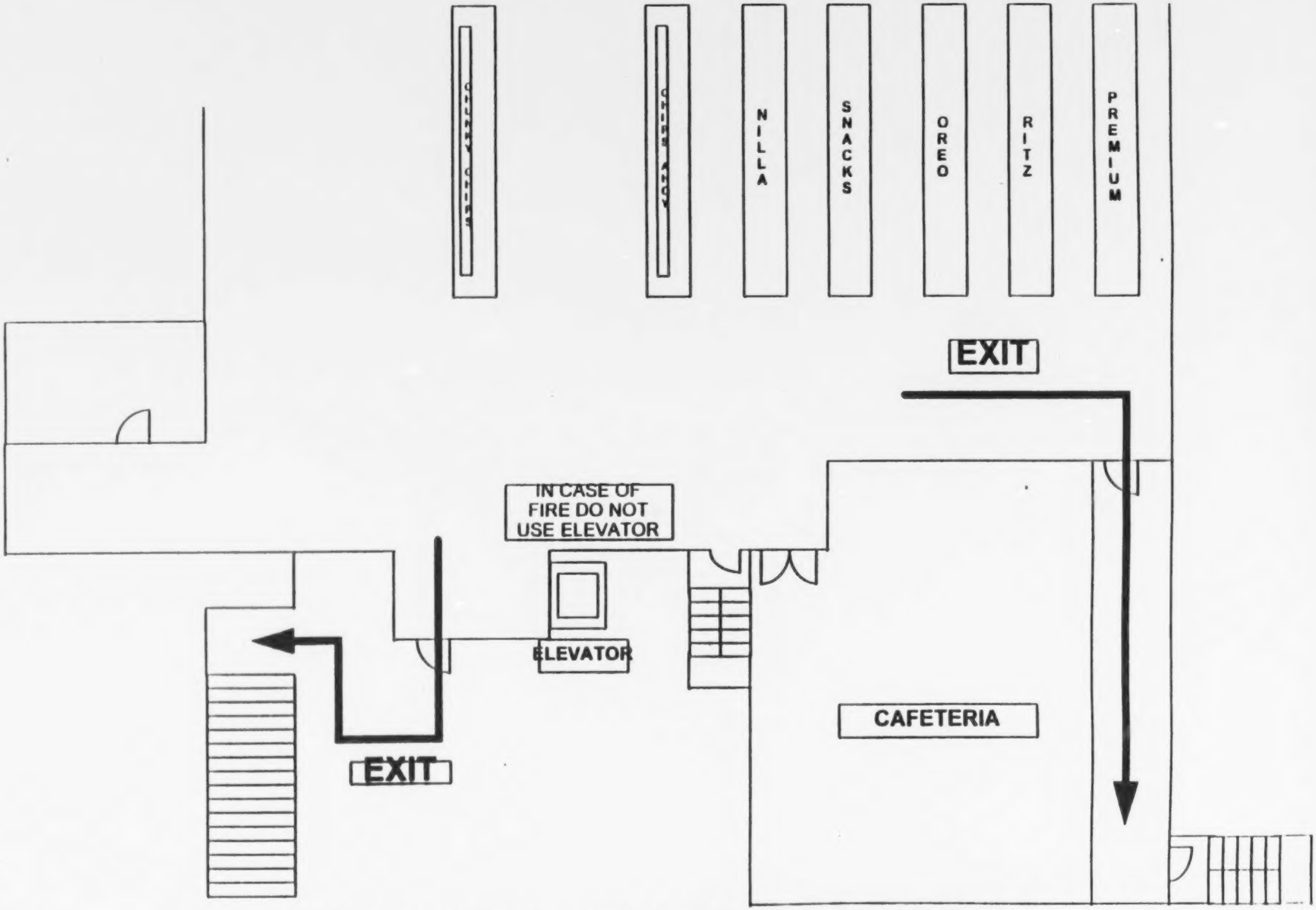
NABISCO, INC. RICHMOND BAKERY / D.C.


FREIGHT ELEVATOR
N
RESTROOMS
COMPUTER ROOM
OFFICE
IN CASE OF FIRE DO NOT USE ELEVATOR
EXIT
EXIT TO 2ND FLOOR ROOF
EXIT
PROOF ROOM
PROOF ROOM

3RD FLOOR - MIXING

7/93 737 738

NABISCO, INC. RICHMOND BAKERY / D.C.


CHUNKY CHIPS
CHIPS AHOY
NILLA
SNACKS
OREO
RITZ
PREMIUM
EXIT
IN CASE OF FIRE DO NOT USE ELEVATOR
ELEVATOR
EXIT
CAFETERIA

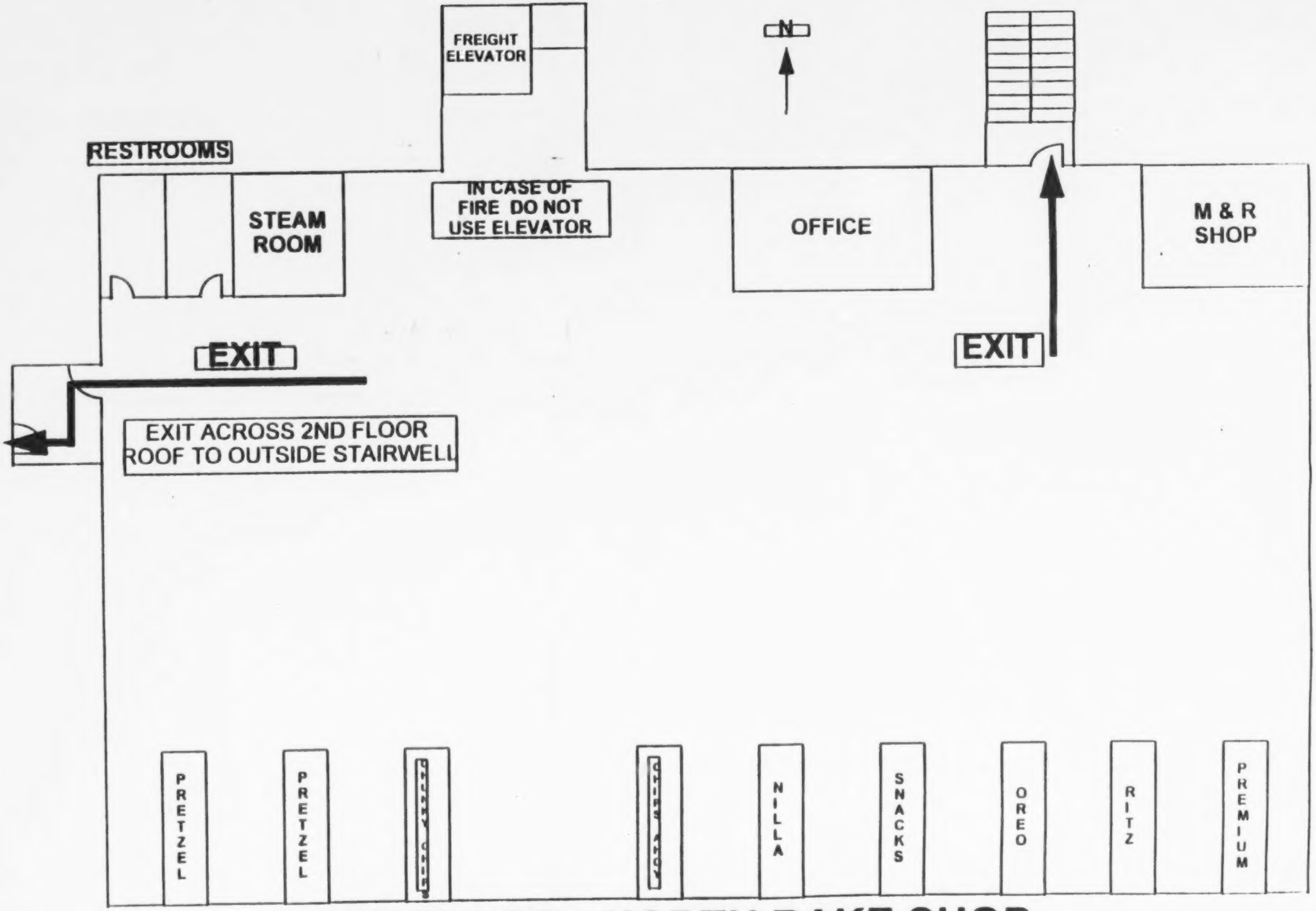
2ND FLOOR - SOUTH BAKE SHOP

NABISCO, INC. RICHMOND BAKERY / D.C.

7 / 93

739

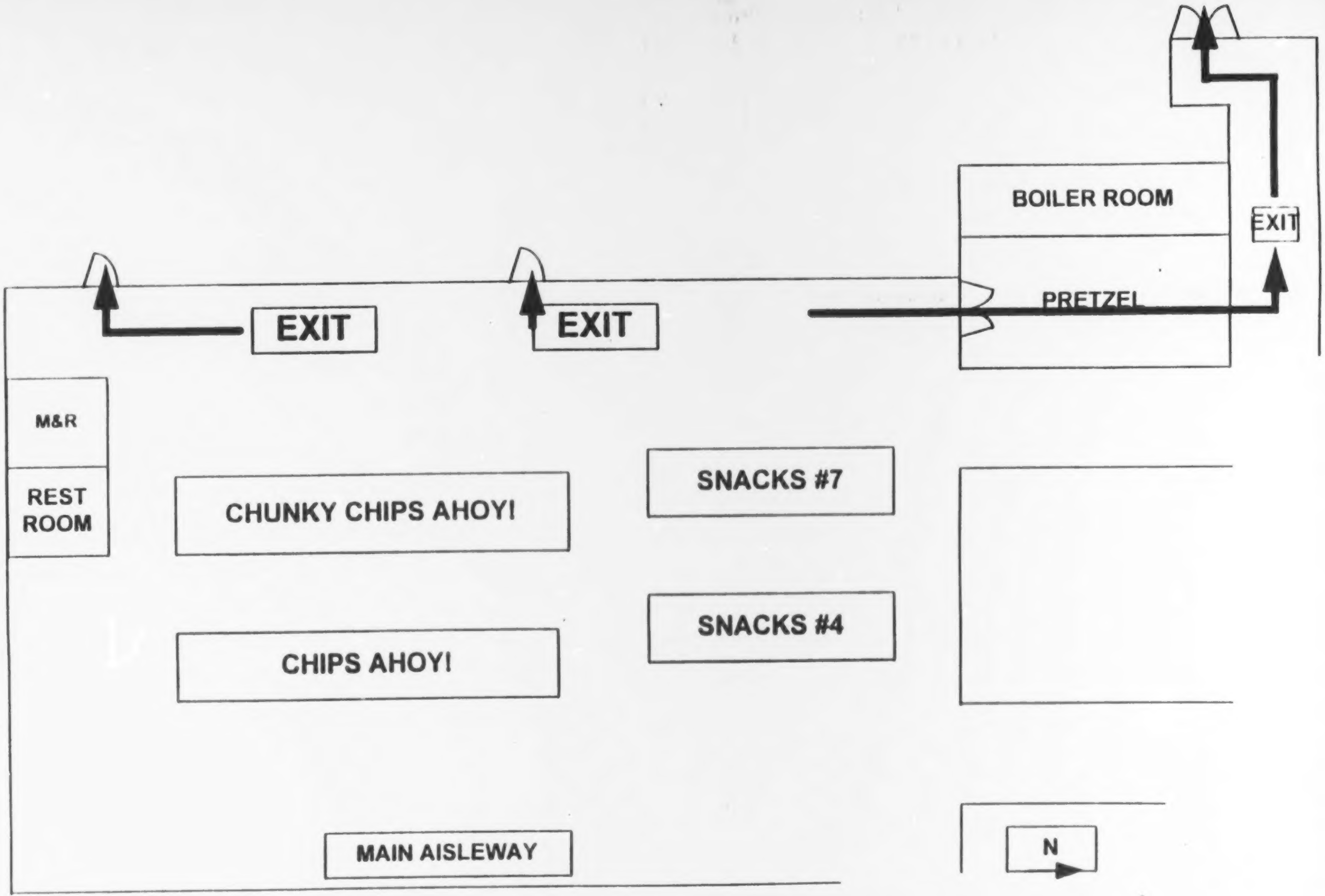
740


FREIGHT ELEVATOR
N
RESTROOMS
STEAM ROOM
IN CASE OF FIRE DO NOT USE ELEVATOR
OFFICE
M & R SHOP
EXIT
EXIT
EXIT ACROSS 2ND FLOOR ROOF TO OUTSIDE STAIRWELL
PRETZEL
PRETZEL
CHIPS AHOY
NILLA
SNACKS
OREO
RITZ
PREMIUM

2ND FLOOR - NORTH BAKE SHOP

NABISCO, INC. RICHMOND BAKERY / D.C.

7/93


BOILER ROOM
EXIT
EXIT
EXIT
PRETZEL
M&R
REST ROOM
CHUNKY CHIPS AHOY!
SNACKS #7
SNACKS #4
CHIPS AHOY!
MAIN AISLEWAY
N

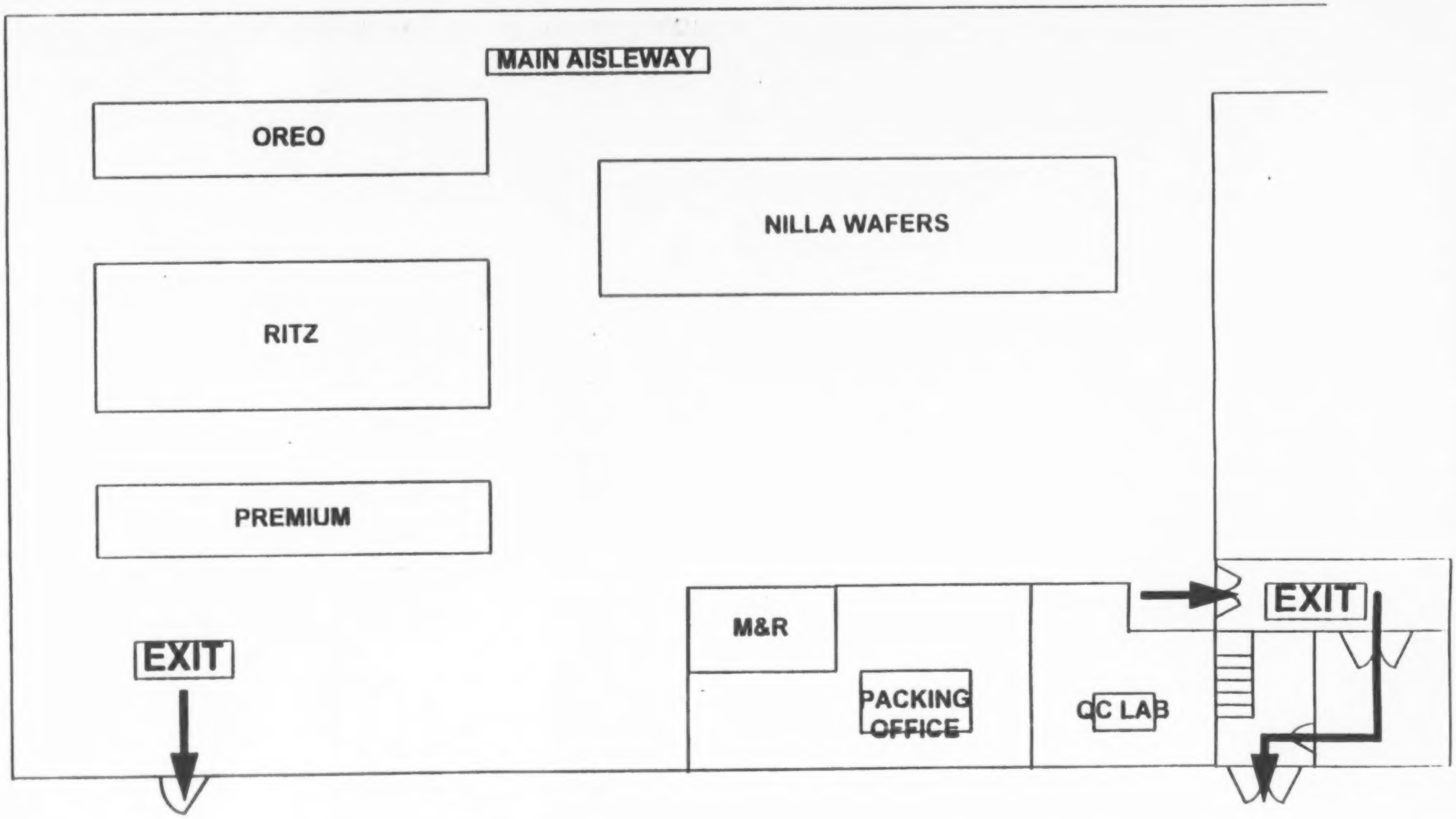
1ST FLOOR - WEST PACKING DEPT.

NABISCO, INC. RICHMOND BAKERY / D.C.

7/93

743

744


MAIN AISLEWAY
OREO
NILLA WAFERS
RITZ
PREMIUM
M&R
EXIT
PACKING OFFICE
QC LAB
EXIT

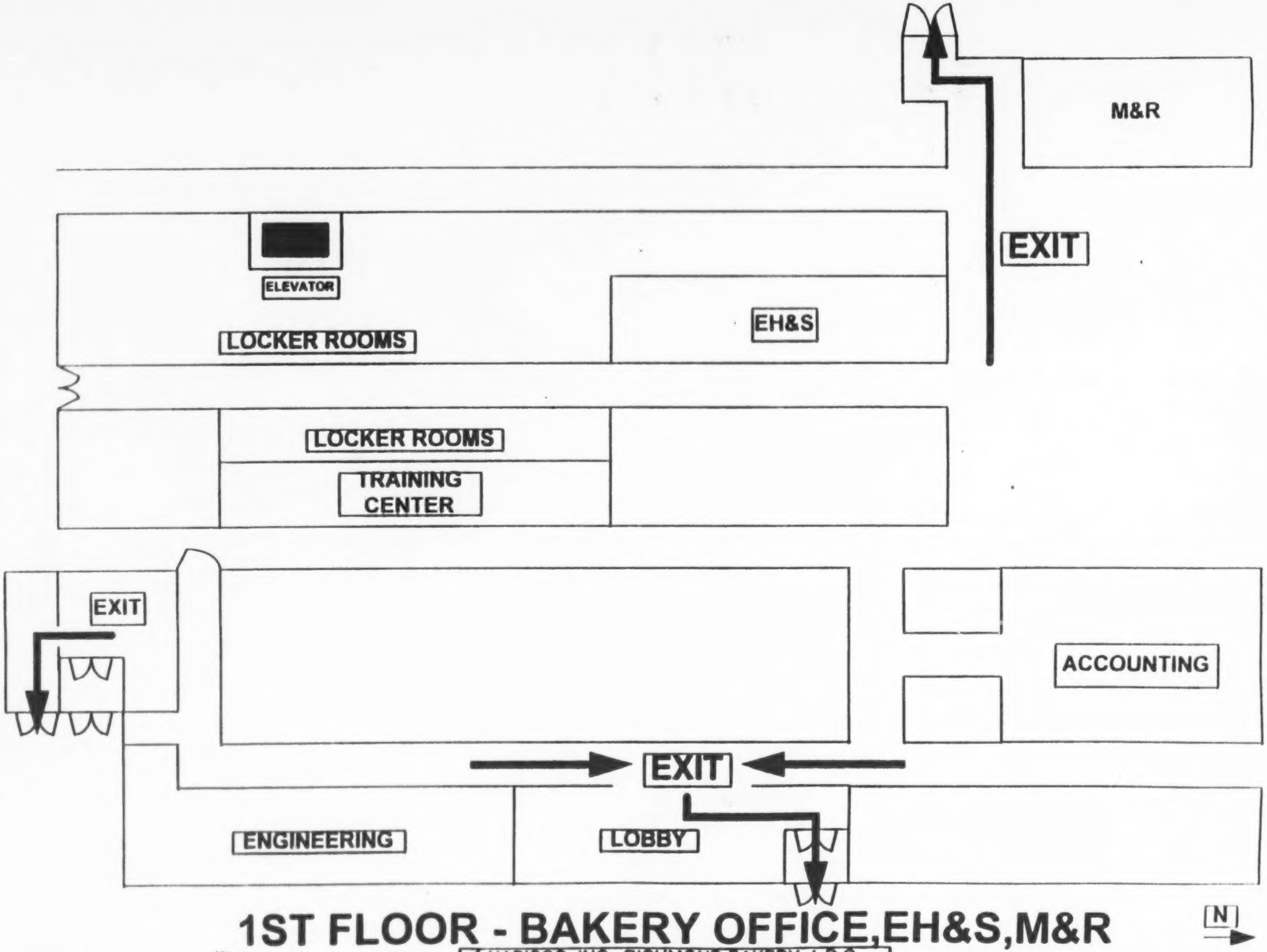
1ST FLOOR - EAST PACKING DEPT.

NABISCO, INC. RICHMOND BAKERY / D.C.

745

746

7/93


M&R
EXIT
ELEVATOR
EH&S
LOCKER ROOMS
LOCKER ROOMS
TRAINING CENTER
EXIT
ACCOUNTING
EXIT
ENGINEERING
LOBBY
N

1ST FLOOR - BAKERY OFFICE,EH&S,M&R

NABISCO, INC. RICHMOND BAKERY / D.C.

7/93

Activity: 10 - Giving and Receiving Oral Directions

Objective(s): This activity will enable participants
1. To practice giving and following oral directions.
2. To reinforce all of the communication concepts learned to date.
3. To develop analytical skills.
4. To develop skill in sequencing instructions.

Materials Required:
1. Large folding map of Metropolitan Richmond area for each participant
2. Set of emergency evacuation diagrams of Nabisco® facility.

Directions:

1. You will be working with a partner. Choose one of the activities below.

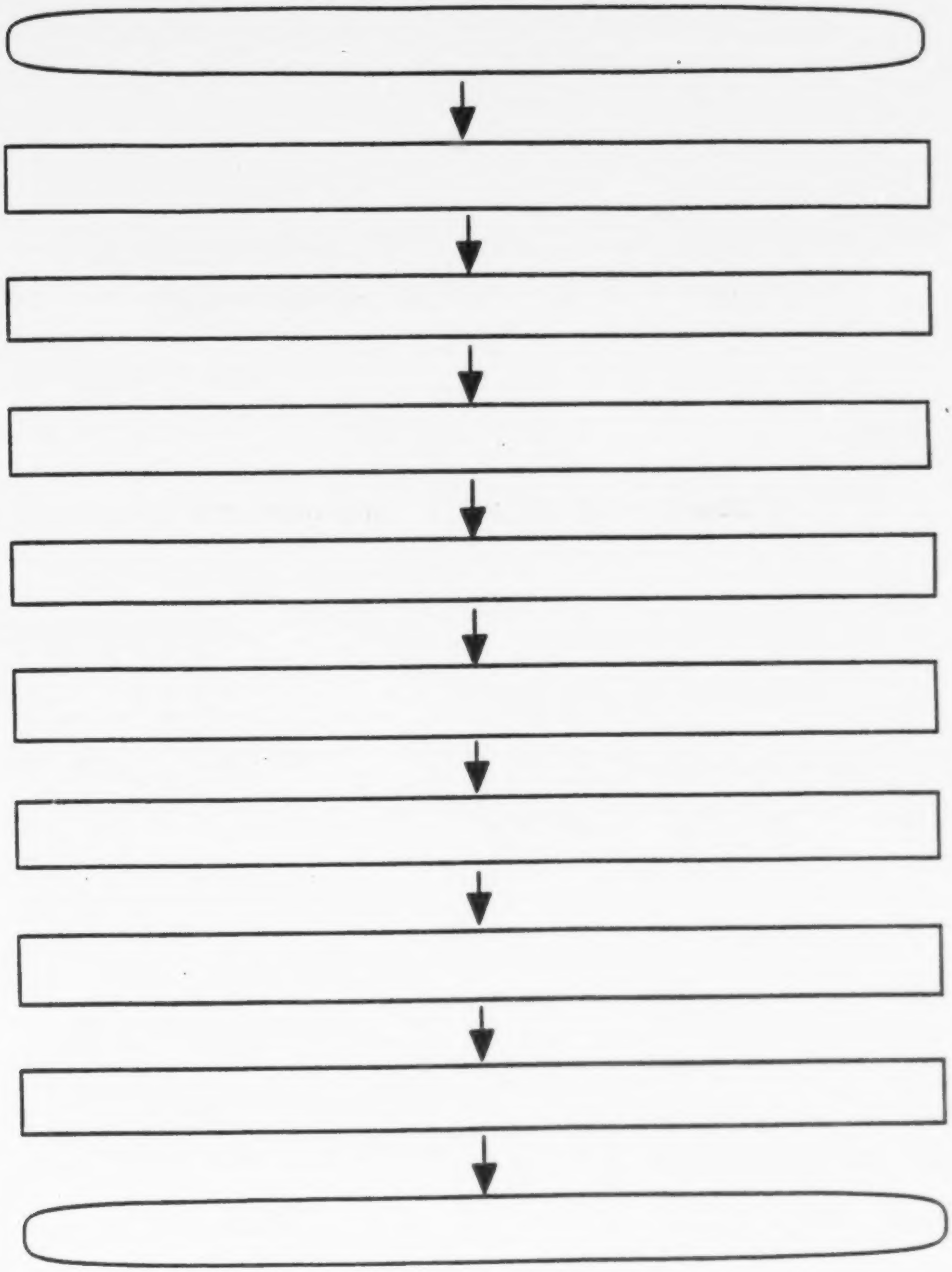
2. The object is for you to plan and give oral directions that are so clear and easy to follow that your partner, using effective and active listening techniques, will reach a predetermined point known only to you.

3. Remember the techniques you've learned for giving directions.

Activity A:
Study the map you've been given and plan (doing a flow chart) how to give oral directions for driving from the work site to your home. If you prefer, you could give directions for getting to a public place such as the baseball park, one of the regional shopping malls, etc. but do not tell your partner what the destination is.

Activity B:
Use the set of emergency evacuation diagrams again as a guide and draw a map showing how to get from the employee parking lot to your work station. Do a flow chart that shows the steps in sequence.

Activity: 10 - Giving and Receiving Oral Directions
Flow Chart



Activity: 11 - Getting Information Orally

Objective(s): This activity will enable participants
1. To practice asking and answering questions to get information they need.

Materials Required:
Information gap activity worksheets
Pen or pencil

You need to know:

About Asking Questions

1. Decide what information you need to have about a situation by asking the "five W's and how" questions to yourself first. Examples:
    a. Who (should page the mechanic when one is needed?)
    b. What (should I do if the ovenband stops?)
    c. When (should I do a cream-up?)
    d. Where (should I check to see which bins need to be fumigated?)
    e. Why (did the belts shut down and the red light start flashing?)
    f. How (many doughs are in the proof room?)

2. You need answers to the "five W's and how" questions in order to do your job effectively and when you don't have those answers, you have an information gap.

3. To close or fill in your information gap, determine who is the best or most likely person to have the answer(s) you need.
    a. Co-workers in the same department
    b. Co-workers in another department
    c. Your internal customer or the person who gets the product after you've done your job.
    d. Your supervisor

4. Generate your questions by
    a. Planning ahead exactly what information you need.
    b. Asking your questions as clearly as you can.
    c. Listening carefully to the answer(s) you get.
    d. Taking notes if necessary.
    e. Evaluating the answers in light of your job.
    f. Repeating the cycle if necessary.

Activity: 11 - Getting Information Orally (continued)

You need to know: (continued)

5. There are two basic kinds of questions:
   a. Open questions don't require a specific answer. People often include their opinions, thoughts and feelings. Example - How should I prepare to measure product breakage?

   b. Closed questions are narrow and usually require a specific answer. People tend to answer closed questions in a direct way, often in a single word or sentence. Example - Should I enter the empty bag weight into the computer?

Directions:

1. You and your partner will have different information for the same incomp graphics.

2. Each of you must correctly fill in your graphics by getting the missing information from your partner through the questions you ask.

3. You should not look at your partner's information.

4. Carefully analyze the information you do have first.

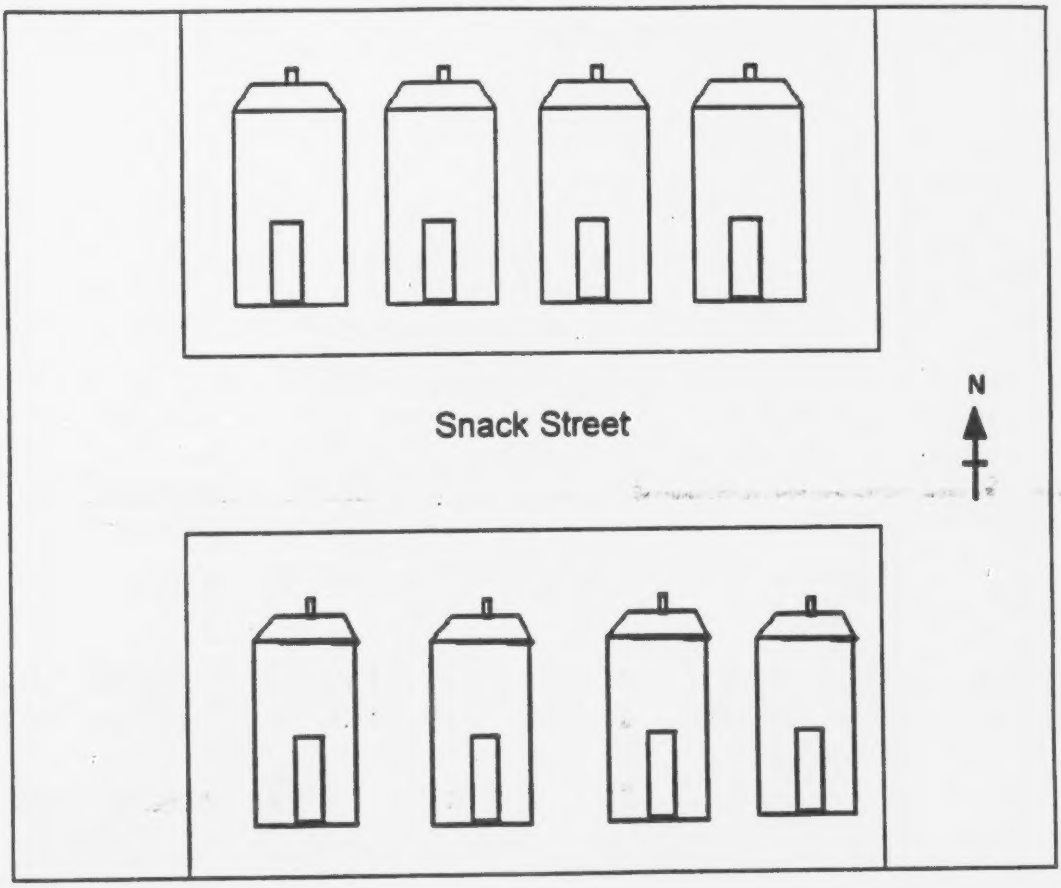
5. Then determine what information you need to get.

6. You and your partner should then ask and answer each other's questions until you both have all the information you need.

Activity: 11 - Getting Information Orally

Exercise 1 - Snack Street

1. Fill in the correct name for each of the buildings on Snack Street below.
2. Remember the techniques for asking questions.
3. Use your reasoning and common sense to name the buildings.



FOODS
GROUP

[illegible]	[illegible]	[illegible]	[illegible]	
		47080		

EQUIP DESCRIPTION
EQUIP AVAILABLE
CRAFT

WORK REQUESTED:

DATE	REQUEST BY APPROVED BY	COMPLETION SIGN OFF		
		DATE	CRAFT PERSON	SUPERVISOR

CLASS WK
WORK ORDER TITLE

CRAFT NUMBER	CAUSE CODE	[illegible]	PLANNER	SUPV ASSIGNED	SHIFT	ACTION CODE	COMPONENT SUB	SUB SUB

MOORE® SPEEDISET® MCP® PATENTED 228

NABISCO
FOODS
GROUP

DEPARTMENT	COST CENTER	WORK ORDER NO	EQUIPMENT NO	RIME
		47079		

EQUIP DESCRIPTION
EQUIP AVAILABLE
CRAFT

WORK REQUESTED:

DATE	REQUEST BY APPROVED BY	COMPLETION SIGN OFF		
		DATE	CRAFT PERSON	SUPERVISOR

CLASS WK
WORK ORDER TITLE

CRAFT NUMBER	CAUSE CODE	[illegible]	PLANNER	SUPV ASSIGNED	SHIFT	ACTION CODE	COMPONENT SUB	SUB SUB

MOORE® SPEEDISET® MCP® PATENTED 228

NABISCO
FOODS
GROUP

DEPARTMENT	COST CENTER	WORK ORDER NO	EQUIPMENT NO	RIME
		47078		

EQUIP DESCRIPTION
EQUIP AVAILABLE
CRAFT

WORK REQUESTED:

DATE	REQUEST BY APPROVED BY	COMPLETION SIGN OFF		
		DATE	CRAFT PERSON	SUPERVISOR

CLASS WK
WORK ORDER TITLE

NUMBER	CAUSE CODE	[illegible]	PLANNER	SUPV ASSIGNED	SHIFT	ACTION CODE	COMPONENT SUB	SUB SUB

HEA

Activity: 11 - Getting Information Orally

Exercise 2 - Work orders

1. On the opposite page are blank work orders.

2. You and your partner will be given different completed work orders.

3. Use the information that your partner has on his completed orders to fill in the heavily outlined areas on the blank work orders.

4. Ask and answer questions with your partner to get the information you need.

Total Group
Listening

Activity: 12 - Giving and Getting Information Via Telephone

Objective(s): This activity will enable participants
1. To practice asking for and receiving information on the telephone.

Materials Required:
1. Telephone
2. Telephone books

You need to know:

About Listening and Speaking to Others
1. Your attitude and your ability to relate to other people (in person and over the telephone) are shown in the way you speak and in the attention you give when you listen.
2. Attitude and ability to relate to others make up about 85% of job success.
3. Prepare to use the telephone by deciding:
   a. How you will introduce yourself.
      When answering your work phone, say the name of your department and then give your name. When making a call, greet, give your name and department and ask for the person you need.
   b. Who you need to speak with.
   c. Why you are calling
   d. What background information you need to give.
   e. What questions you need to have answered.

Activity: 12 - Giving and Getting Information Via Telephone (continued)

Directions:

1. Fill in the charts with the information you gather as you make the following phone calls.

2. You may complete this activity at home as needed.

3. To gain practice, you must make each call yourself.

CALLS for Chart A

1. Call at least three suppliers of building materials to find the lowest prices for 2" x 4" studs in eight foot lengths.

2. Choose a city you would like to visit. You must be there by 9:00 p.m. on Friday. What will be the best way to get there - plane, train or bus?

CALLS for Chart B

3. You have to send a 20 pound package to Los Angeles, California, for delivery no later than 12 noon on next Tuesday. The Zip Code for the delivery is 90210. You need to send the package the cheapest way possible. Practice your telephone skills and get the information you need to make a decision.

Activity: 12 - Chart A

	Supplier 1	Supplier 2	Supplier 3	Airline	Amtrak	Bus
Step 1. Greeting- "Hello. This is ________."						
Step 2. "With whom am I speaking?"						
Step 3. "I'd like to get some information about ________." OR						
Step 4. "I'm working on a project for a class and I need ________."						
Step 5. Notes (Answers to your questions)						

Activity: 12 - Chart B

	Post Office	UPS	Federal Express	Other	Other
Step 1. Greeting- "Hello. This is ______________."					
Step 2. "With whom am I speaking?"					
Step 3. "I'd like to get some information about ____________." OR					
Step 4. "I'm working on a new project for a class and I need ______________."					
Step 5. Notes (Answers to your questions)					

Activity: 13 - Communicating Within a WorkGroup

Objective(s): This activity will enable the participant

1. To develop an awareness of the concept of workplace culture.
2. To identify the workplace culture at an organization.

Materials Required:
None

You need to know:

About Workplace Cultures

Every workplace is different in that every workplace has its own way of doing things; it's own culture. Listening actively will help you understand the culture of your workplace and your co-workers.

To understand the culture of your workplace, you have to learn four things about it:

1. The goals of the particular workplace. What are you expected to do?
2. The values of your workplace. What are the most important priorities here? What are the standards to which work has to be done or behavior has to be focused?
3. The customs of your workplace. What are the rules or procedures that are followed here?
4. The networks in your workplace. How does information flow here? Who talks to whom?

Directions:

1. Use the chart on the next page to organize your thoughts and notes from our discussion.

Activity: 13 - Communicating Within A WorkGroup

	Workplace #1	Workplace #2	Workplace #3
Goals			
Values			
Customs			
Networks			

Total Group
Listening

Activity: 14 - Communicating With Co-Workers

Objective(s): This activity will enable participants
1. To practice techniques for communicating effectively with co-workers.

Materials Required:
None

You need to know:

About Listening and Speaking to Co-Workers

Please DO	Please DON'T
1. Learn the workplace culture-the written (if any) and unwritten rules of co-worker communication.	Ignore the acceptable ways of communicating in your workplace.
2. Maintain an upbeat, "can do" attitude.	Be influenced by negative shop talk.
3. Learn the workplace jargon or special language.	Hesitate to ask questions when you need information.
4. Be mindful of your non-verbal language and behavior.	Infringe on other's personal space.
5. Remember that the tone of your voice sends more of a message than the actual words say.	Forget about all the non-verbal messages you send.
6. As much as possible, choose a good time to discuss a problem.	Try to discuss problems when others are rushed, distracted or upset.
7. Describe the problem carefully, avoiding personal criticism.	Let discussions of workplace problems become attacks on anyone's compentence.
8. In general, concentrate on the problems themselves; not on blaming.	Be distracted by the way problems are stated by your co-workers.

Activity: 14 - Communicating With Co-Workers (continued)

Please DO	Please DON'T
9. Limit the amount of personal information you share at the workplace.	Allow your personal life to interfere with your workplace responsibilities.
10. Use the active listening techniques with your co-workers giving supportive feedback when and where possible.	Let your emotions get out of control.

Directions:

1. Separate into occupational groups of no more than four people.

2. Each group member should share their perspective of a workplace communication with a co-worker (no names, please) that could have been improved if they or the co-worker had used more effective communication techniques.

3. Within your small groups, decide on several of the situations to discuss with the total group. Limit your discussions to situations about:
   a. telling co-workers about workplace needs or problems or
   b. telling co-workers on the next shift about the current status of an assignment station, piece of equipment, etc.

4. Add to your list of Please Do and Please Don't as the total group discussion unfolds.

Total Group
Listening

Activity: 15 - Communicating With Supervisors

Objective(s): This activity will enable participants

1. To develop an understanding of an employee's roles and responsibilities in employee/supervisor communications.

Materials Required:
Pen or Pencil

You need to know:

About Your Responsibilities as an Employee

1. One of your most important responsibilities is to let your supervisor know about the work that you're doing.
2. Make every effort to learn what your supervisor expects you to tell him and how and when you should tell him. Learn what information is critical (requiring immediate notification of your supervisor) and what information is not as important. Generally, your supervisor wants to know about any work situation that has an impact on how he does his job.
3. Never feel that you shouldn't ask for information or any assistance that's needed to do your job. If you don't know how to do a job task, let your supervisor know.

Activity: 15 - Communicating With Supervisors (continued)

You need to know:

About Communicating With Your Supervisor

Remember To:	Try Not To:
Follow the standard operating procedure when communicating with your supervisor	Go against company policy or workplace culture in talking with your supervisor.
Understand as much about a situation as you can before talking to your supervisor	Give inaccurate or insufficient information to your supervisor.
Focus on the facts that you're giving to your supervisor	Focus on your supervisor's personality or the negative influences of your co-workers. Don't blame other people for problems.
Listen actively to your supervisor. Respond to him in accordance with what he asked; not what you think he said.	Show negative behavior that will only work against you.
Listen actively so as not to become confrontational or defensive or apologetic because of a misinterpretation of what was said.	

Directions:

1. Analyze communication situations you've had with your supervisor over the past few weeks. Think about situations in which you were given information or directions by your supervisor. Also, think about situations where you had to give your supervisor information or tell him about a problem.

2. Use the chart on the opposite page to organize your thoughts as we prepa to discuss some of these supervisory communication situations.

Total Group
Listening

Activity: 15 - Communicating With Supervisors

	Equipment	Materials	Procedure or Production Process	Labor/Scheduling
What (is the situation) or What (happened)				
When				
Where				
Why				
How				

Activity: 16 - Group Behavior

Objective(s): This activity will enable participants
1. To practice identifying positive and negative group behavior.

Materials Required:
1. Teacher dictated group communication materials.

You need to know:

About Group Behavior

Just as each person has a special personality, each group of people develops a personality also. The group's personality is influenced by the roles each member takes on. Group members tend to take on roles that are an extension of their own personality - being a leader or a joker; being a quiet observer or an agitator and so forth.

The important thing to understand is that the behavior of each group member will affect the group's ability to achieve the goal that should be common to everyone.

Behavior that Helps a Group
1. opening up discussions
2. contributing ideas
3. explaining to new members
4. asking questions
5. answering questions
6. asking for opinions
7. offering opinions
8. taking notes
9. listening to others
10. ____________________

Behavior that Hurts a Group
1. dominating discussions
2. discouraging ideas
3. playing
4. blocking development of ideas
5. "lobbying" for a personal or special interest
6. trying to get undue recognition or attention
7. ____________________
8. ____________________

Activity: 16 - Group Behavior

Directions:

1. Listen carefully as comments people have made in group discussions are read.
2. We will discuss which comments are positive behaviors and which are negative behaviors.
3. Refer to the lists above and add to them if you'd like.

Activity: 17 - Group Dynamics

Objective(s): This activity will enable participants
1. To develop an awareness of the stages of group dynamics.

Materials Required:
None

You need to know:

About Group Dynamics
Group dynamics refers to the collective pattern of behavior that unfolds as any group of people begin working together towards a common goal. There are several predictable stages of group dynamics and they are universal.

1. At first, a group leader seems to emerge from within the group and most members seem content to follow the leader while they "sort out" other group members and the job the group has to accomplish.

2. Next, and without most group members even realizing it, the members arrange themselves according to their roles, their influence within the group and their expertise.

3. In the next phase,group members become more related and develop a sense of belonging to the group.

4. The last stage of group dynamics begins when members actually begin working and communicating freely with each other in accomplishing the common goal of the group.

Directions:

1. The remaining activities in this module will require communicating within a group.

2. In addition to practicing and improving your listening, speaking, and group participation skills, observe the dynamics of the various groups.

Activity: 18 - Group Decision Making

Objective(s): This activity will enable participants
1. To understand three of the ways a group reaches a decision.
2. To practice making decisions within a group.

Materials Required:
1. Paper
2. Pen or pencil

You need to know:

About Group Decision Making
Groups of people have three basic ways of reaching decisions.

1. Dictatorship. A single group member takes over and makes the decisions for the entire group.

2. Majority Rule. Each group member votes on the decision to be made and the majority wins.

3. Consensus. Each group member decides on the one decision or solution that is acceptable enough so that the entire group is able to support or live with the decision. This method takes time, communication, open-mindedness, creative thinking and total participation. It is the most desirable way to reach a group decision because everyone wins.

Activity: 18 - Group Decision Making (continued)

DINING ROOM STAFF - 3RD Shift

Before leaving each night, you must:

-vacuum carpeting and wet clean tile foyer

-discard flower centerpieces as necessary/refill containers

-change tablecloths

-refill salt and pepper shakers and return them to the tables

-return chairs to tables

-set tables with napkins, silverware, glasses, and coffee cups inverted

-change menus

-add daily special to menus

Activity: 18 - Group Decision Making

Directions:

1. Separate into groups of five members.

2. Pretend that four of the group members work the evening shift in the restaurant of the best resort hotel in the area.

3. The fifth group member will act as an observer of the group.

4. Go over the notice on the opposite page that was on the bulletin board at the restaurant.

5. Each of you should number the items listed on the notice in the order you think they should be done.

6. Then, work together as a group to reach a decision about the most efficient order for the duties.

7. Be ready to express and defend your opinions but practice good group participation skills.

Activity: 19 - Demonstration Production Line

Objective(s): This activity will enable participants
1. To demonstrate an understanding of group process.
2. To practice effective communication within a group.
3. To practice group decision making skills.

Materials Required:
1. Demonstration Production Line Situation Materials
2. Pen or pencil

You need to know:

Techniques for Being a Successful Group Participant

Understand the Group's Members

Upon joining a group, learn the names of the other group members. Learn all you can about each person's abilities and attitudes. Look at group members who are talking. Scan others in the group for non-verbal signs of interest or disinterest. Decide who the group's leaders are.

Understand How the Group Makes Decisions

Identify what the groups standards are. What does the group consider to be acceptable ways to resolve conflict, etc.? Determine what the groups goals are and what the plans are for reaching the goal.

Use Effective Communication Skills

Always use positive behaviors (verbal and non-verbal). Avoid negative comments and excessive talking. Use active listening techniques when appropriate.

Activity: 19 - Demonstration Production Line

Directions:

The Situation

Nabisco® has been invited to participate in an upcoming World's Fair. It has been decided that the company will have a demonstration production line that will actually be a mini bakery for only one product. The public will be able to view the production process from start to finish and they will then be able to purchase the cookies that they have just seen being made.

The facility for the demonstration line does not yet exist and can be built to meet the mini bakery's needs. A special rail line has been built to the site of the Fair and an excellent highway system is in place also.

The Challenge

The REACH participants have been asked to contribute (based on their knowledge) to the planning of the demonstration production line from start to finish.

You need to consider:

1. The need to maintain and even build upon the excellent public relations the company enjoys.
2. The need to create a totally functioning yet scaled down production line with a minimum investment.
3. The need to produce a consistently high quality product, seven days a week from 10:00 a.m. to 10:00 p.m. (the hours of the Fair).
4. The need to produce and package the product for an estimated 25,000 fair goers daily.

Total Group
Listening

Activity: 19 - Demonstration Production Line

Part A

1. Separate into job groups (mixers, utility, etc.)

2. As a job group, envision what your department would be like in the above situation. Make the following decisions:

   a. the single product you think should be produced. What factors influenced your decision?

   b. what the basic requirements would be for your department to "set up" its duties. Which machinery and/or equipment would be needed?

   c. what job positions would be needed and how many people should be scheduled over 12 hours to fill those positions?

   d. what policies and procedures should your department put in place to contain costs?

   e. what policies and procedures should be put in place to facilitate being on public display? (Uniforms, communication methods, sanitation procedures, etc.)

   f. what recommendations would you make to the designer of the facility to ensure that your department's needs for space, safety, noise control, etc., are met.

Part B

1. Now that each job group has reached a decision about each department's needs, as a total group (all occupations together) discuss the same factors and come to a total group decision on each.

2. This is only an exercise. There are no right or wrong answers. This is an opportunity to put into practice all the communication skills you've learned to date.

Problem Solving

This module is designed to help you develop critical thinking skills and interact in a group. All materials are provided by the facilitator. All handouts are in the facilitator's manual.

REACH Program
Understanding How to Use Your Calculator Activities

Cluster:______

Activity 1 - Understanding how to use a Calculator

Objective (s): This activity will enable participants

1. To become familiar with the keys of a calculator
2. To become familiar with the functions of a calculator
3. To practice entering numbers in a calculator

Materials Used: calculator

You Need to Know:

The second college edition of *The American Heritage Dictionary* defines a calculator as a keyboard machine for the automatic performance of mathematical operations. In today's work environment users simply refer to the calculator as their best friend because they are fast and accurate. However, workers understand that the answers a calculator provides are as accurate as the person using the calculator. That's why it is important to know how your calculator works.

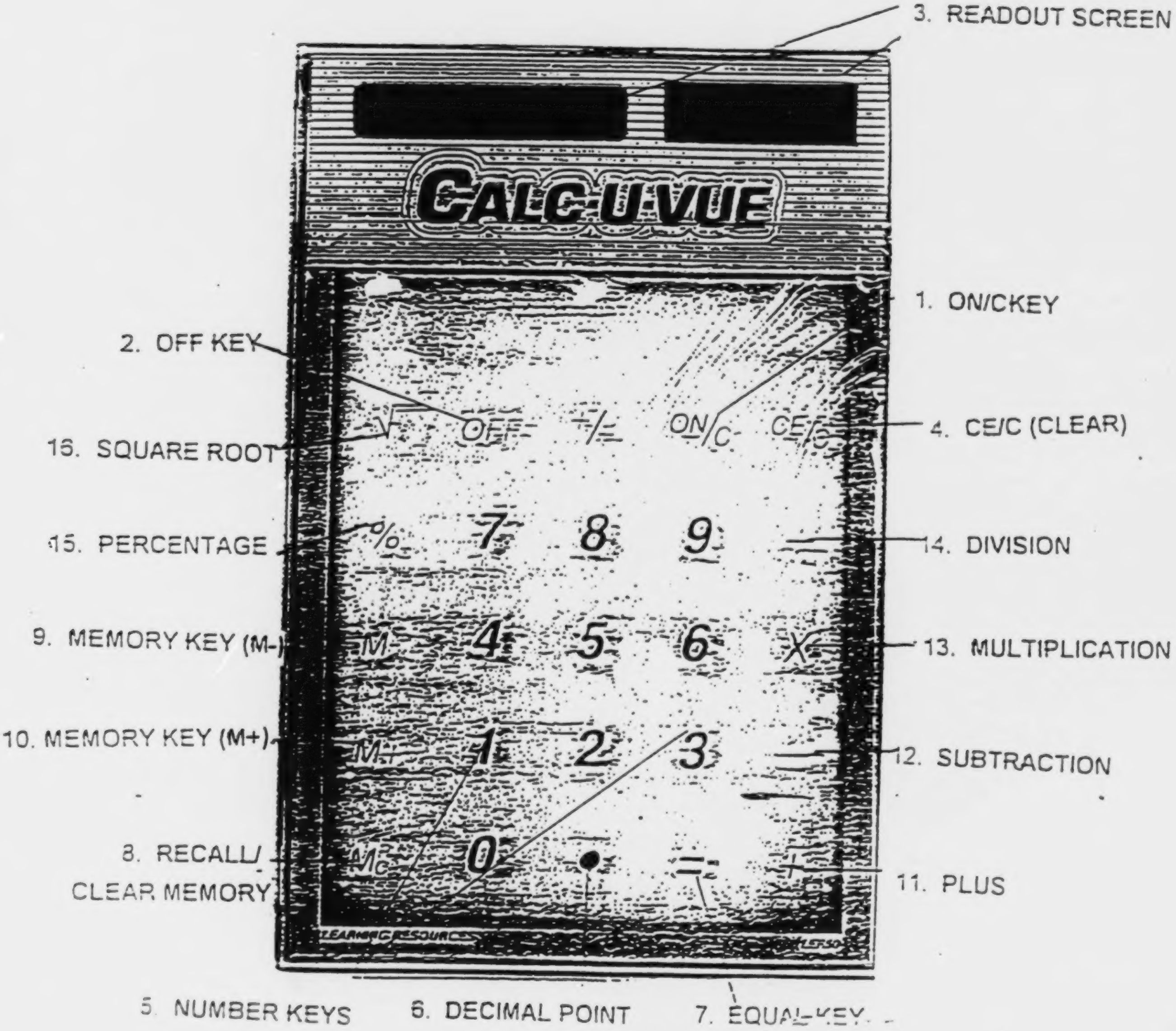
All calculators perform the four basic mathematical functions of addition, subtraction, multiplication, and division. There are other calculators that perform more advance math functions such as square roots, plotting, advanced calculus, and many other scientific calculations. Texas Instruments Inc. is one of many companies that manufacture scientific calculations. In this course, you will be using a basic calculator. It is a calculator that performs the basic four mathematical functions, percentages, and square roots.

Calculators operate by solar-power or battery. Solar-powered calculators have a row of solar cells that change light into electricity. Battery-powered calculators contain a battery, usually in the back of the calcuator. Now, let's get familiar with the calculator. Read through the calculator diagram on the following page.

CALCULATOR DIAGRAM

Directions

Study your calculator. Notice what each key does.


3. READOUT SCREEN
CALC-U-VUE
1. ON/CKEY
2. OFF KEY
16. SQUARE ROOT
OFF
+/-
ON/C
CE/C
4. CE/C (CLEAR)
15. PERCENTAGE
%
7
8
9
14. DIVISION
9. MEMORY KEY (M-)
M-
4
5
6
X
13. MULTIPLICATION
10. MEMORY KEY (M+)
M+
1
2
3
12. SUBTRACTION
8. RECALL/
CLEAR MEMORY
MC
0
•
=
+
11. PLUS
LEARNING RESOURCES
5. NUMBER KEYS
6. DECIMAL POINT
7. EQUAL-KEY

Keys

1. **ON/C KEY** - Use this key to turn your calculator on.

2. **OFF KEY** - Use this key to turn your calculator off.

3. **READOUT SCREEN** - Read the answers on this display screen.

4. **CE/C (CLEAR)** - Use this key to erase your entries.

5. **NUMBER KEYS** - Use these keys to enter the numbers.

6. **DECIMAL POINT** - Use this key to insert a decimal point.

7. **EQUAL KEY** - Use this key to get the answer.

8. **RECALL/CLEAR MEMORY (RM/CM) KEY** - Use this key to retain a number entry in the calculator's memory. Consider this sample problem: 100-10 = 90, press the RM/CM and the answer 90 is subtracted from the first entry 100. The answer is a negative 10. This key is helpful when you're working with a series of numbers.

9. **MEMORY KEY (M-)** - Use this key when working with a series of numbers and different functions. The calculator will hold an answer in memory. For example, 10-5=5, press M- key, the answer is 5, press (-) key, enter 2, press, M- key, the answer is 3. Notice the "M" appears on the readout screen to let you know the memory key is on.

10. **MEMORY KEY (M+)** - Use this key add a series of numbers. Consider this example, 10+5=5, press M+ key, the answer is 15, press (+) key, enter 5, press M+ key, the answer is 20.

Function Keys

11. **PLUS** - Use this key to add numbers.
12. **SUBTRACTION** - Use this key to subtract numbers.
13. **MULTIPLICATION** - Use this key to multiply numbers.
14. **DIVISION** - Use this key to divide numbers.
15. **PERCENTAGE +/-** - Use this key to calculate percentages.
16. **SQUARE ROOT** - Use this key to calculate the square root of numbers.

Practice

Follow these steps to practice entering whole numbers with your calculator.

Step 1: Turn on your calculator by pressing the key with **ON/C KEY**.
Step 2: Enter a number from the list below on your calculator.
Step 3: Erase the number using the CE/C key.
Step 4: Repeat steps 2-3 until you've entered and erased all the numbers for this exercise.
Step 5: Turn off your calculator.
Note: Most calculators do not display a comma. If the number displays as 1960, simply count three number places from the left. In this case 0, 6, 9, the comma would be inserted after the number 1 (1,960). Any number over 999 should be written with a comma.

A. Practice entering numbers.

1. 349
2. 974
3. 9,175
4. 8, 387
5. 27,285
6. 342,829
7. 88,642
8. 347,829
9. 755,691
10. 2,596,327
11. 9,442,611
12. 5,678

B. Entering numbers with decimal points.

Step 1: Turn on your calculator by pressing the key with **ON/C KEY**.
Find the decimal key (.) on your calculator.
Step 2: Enter the number 12
Step 3: Press the decimal key (.)
Step 4: Then enter the number 2
Step 5: Press CE/C key to erase the number 12.2

Practice Exercise Continued...

Step 6: Repeat steps 2-4 until you've entered and erased all the numbers for this exercise.
Step 7: Turn off your calculator.

1. 56.78
2. 99.28
3. 110.8
4. 555.75
5. 100.78
6. 12.58
7. 600.78
8. 900.00
9. 88.8
10. 6.67

Activity 2 - Using and Understanding the Addition Function

Objectives (s): This activity will enable participants

1. To become familiar with the addition function of a calculator
2. To practice the addition function on a calculator

Materials Used: scrap paper, calculator

Directions

A calculator makes adding numbers easy. Follow these steps when adding numbers on your calculator.

Step 1: Turn on your calculator. Look for the plus (+) sign. Then look for the equal (=) sign. You will use both of these keys when you are adding numbers.
Step 2: Enter the numbers 1, 0, 0
Step 3: Press the plus sign (+)
Step 4: Enter 2, 0, 0
Step 5: Press the equal key (=)
Step 6: Read the answer in the readout screen area. The answer is 300.

Practice

Use your calculator to find the sum of the numbers. Write your answers in the space provided.

A. Find the sum.

1. 3,156, 7,125 ________
2. 7,206, 4,926, 3,331 ________
3. 8,501, 6,742 ________
4. 5,123, 9,600, 7,689 ________
5. 3,900, 6,174 ________
6. 378, 4,214 ________

B. Find the sum.

1. 16.2, 12.06________
2. 123.0, 451.2 ________
3. 5.2, 6.8 ________
4. 234.2, 123.5 ________
5. 6.1, 6.4 ________
6. 12.1, 45.2 ________

Activity 3 - Using and Understanding the Subtraction Function

Objectives (s): This activity will enable participants

1. To become familiar with the addition function of a calculator
2. To practice the subtraction function on a calculator

Directions

A calculator makes subtracting large numbers easier. Follow the steps to subtract the numbers.

Step 1: Turn on your calculator. Find the minus (-) sign. The find the equal sign (=).
Step 2: Enter the numbers 6, 0, 0. When subtracting remember to enter the larger number first.
Step 3: Press the minus sign (-)
Step 4: Enter the numbers 3, 0, 0
Step 5: Press the equal (=) key. The answer is 300.

Practice

Use your calculator to find the difference between the numbers. Write your answers in the space provided.

A. Find the difference.
1. 7,500, 5,916 ______
2. 9,306, 8,200 ______
3. 3,472, 1,568 ______
4. 99, 48 ______
5. 5,280, 1,000 ______
6. 18,480, 15,840 ______
7. 5, 820, 1,760______
8. 2,786, 1,308 ______
9. 2,815, 1,940 ______
10. 2,182, 655______
11. 1,075, 758 ______
12. 2,631, 131 ______

B. Find the difference.

1. 31. 2, 12.6______
2. 119.1, 67.0 ______
3. 303.1, 240.2 ______
4. 45.3, 23.2 ______
5. 20.1, 18.2 ______
6. 25.9, 12.8 ______

Activity 4 - Using and Understanding the Multiplication Function

Objectives (s): This activity will enable participants

1. To become familiar with the multiplication function of a calculator
2. To practice the multiplication function on a calculator

Directions

A calculator can also make multiplication easier. Read the example below. Follow the steps to understand how to use your calculator to multiply large numbers.

Step 1: Turn on your calculator. Find the multiplication sign (x). Find the equal sign (=).
Step 2: Enter the numbers 8, 5, 6, 4
Step 3: Press the x sign
Step 4: Enter the numbers 7, 2, 1, 3
Step 5: Press the equal sign (=). Read the answer on the readout screen. The answer is 61,772,132 (66 million, 772 thousand, 132).

Practice

Use the calculator to find the product of each group of numbers. The answer to a multiplication problem is called the product. Write the product in the space provided.

A. Multiply the numbers.
1. 6, 6 ______ 2. 27, 4 ______ 3. 12, 12 ______ 4. 50, 6 ______
5. 20, 20 ______ 6. 200, 7 ______ 7. 500, 8 ______ 8. 1000, 8 _____

B. Multiply the numbers.
1. 5,306, 8,317 ______ 2. 648, 4,269 ______ 3. 510, 888 ______

4. 92,000, 45 ______ 5. 80,000, 25 ______ 6. 357, 968 ______

Activity 5 - Using and Understanding the Division Function

Objectives (s): This activity will enable participants

1. To become familiar with the division function of a calculator
2. To practice the division function on a calculator

Directions

You can also solve division problems using your calculator. Follow the sample problem to understand the process. Find the division (÷) sign on your calculator.
Step 1: Turn on your calculator.
Step 2: Enter the numbers 2,0,0
Step 3: Press the division sign (÷).
Step 4: Enter the number 1, 0
Step 4: Press the equal sign (=).
Step 5: Read the answer on the display screen. The answer is 20.

Practice

A. Divide the numbers.

1. 500, 20 ______
2. 600, 30 ______
3. 20, 5 ______
4. 1000, 6 ______
5. 790, 5 ______
6. 180, 4 ______

B. Divide the numbers.

1. 10,000, 90______
2. 124,780 ,20______
3. 45,000, 60______
4. 985, 3 ______
5. 50,650 ,10 ______
6. 540, 25 ______

Activity 1 - Whole Numbers

Objective(s): This activity will enable participants to identify and write whole numbers.

Materials Required:
Pencil

You need to know:

1. Whole numbers are counting numbers and 0; they are numbers that are not fractions or decimals. They tell how many or how much.

2. A whole number represents a complete amount or group.

   EXAMPLES:

   Numbers: 0, 6, 13, 20, 50, 234

   Quantities: 142 machine screws, 12 spools, 47 outlets

   Measurements: 63 feet, 120 millimeters, $354

3. The Arabic number system is based on 10 digits:

   0 1 2 3 4 5 6 7 8 9

   Each of these symbols (0-9) is called a digit. These individual symbols (digits) may be combined to write any number.

Activity 1 - Whole Numbers (continued)

Directions: For each of the following numbers place a (✓) in the box if the number is a whole number.

1. ☐ 6
2. ☐ 14
3. ☐ 37
4. ☐ 365
5. ☐ 901
6. ☐ 2,225
7. ☐ 6,592
8. ☐ 8,831
9. ☐ 4,895
10. ☐ 33,485
11. ☐ .6
12. ☐ .005
13. ☐ .07
14. ☐ 2.5
15. ☐ .82
16. ☐ .231
17. ☐ .7304
18. ☐ 1491
19. ☐ 20.04
20. ☐ 7.83
21. ☐ 4
22. ☐ 15
23. ☐ 82
24. ☐ 359
25. ☐ 763
26. ☐ 2,227
27. ☐ 6,552
28. ☐ 8,231
29. ☐ 3,998
30. ☐ 50,001
31. ☐ .1
32. ☐ .5
33. ☐ .7
34. ☐ .25
35. ☐ .076
36. ☐ .226
37. ☐ 7.304
38. ☐ 14.91
39. ☐ 2.004
40. ☐ .783
41. ☐ 8
42. ☐ 18
43. ☐ 56
44. ☐ 321
45. ☐ 288
46. ☐ 2,221
47. ☐ 6,512
48. ☐ 8,631
49. ☐ 7,246
50. ☐ 29,092
51. ☐ .8
52. ☐ .05
53. ☐ 7
54. ☐ 25
55. ☐ .08
56. ☐ .217
57. ☐ 73.04
58. ☐ .1491
59. ☐ 200.4
60. ☐ .0783

Activity 1 - Whole Numbers (continued)

Directions: For each of the following numbers place a (✓) in the space if the number is a whole number.

__________ 1. 4,699
__________ 2. 96.677
__________ 3. 620
__________ 4. 2.053
__________ 5. .4001
__________ 6. 28
__________ 7. .1
__________ 8. 8,261.1
__________ 9. 1.25
__________ 10. 27,611.9
__________ 11. .07
__________ 12. .0001
__________ 13. .367
__________ 14. 3,842
__________ 15. 493,200
__________ 16. 926.
__________ 17. 6.790
__________ 18. 58,416
__________ 19. 6,815
__________ 20. 649,873
__________ 21. .072
__________ 22. .84
__________ 23. .7159
__________ 24. .638
__________ 25. .3901
__________ 26. 495.28
__________ 27. 6215.9
__________ 28. 518.7302
__________ 29. 429,631.058
__________ 30. 85,210.3697

Activity 1 - Whole Numbers (continued)

Directions: Write examples of whole numbers in the following blanks.

______________ 1.

______________ 2.

______________ 3.

______________ 4.

______________ 5.

______________ 6.

______________ 7.

______________ 8.

______________ 9.

______________ 10.

______________ 11.

______________ 12.

______________ 13.

______________ 14.

______________ 15.

______________ 16.

______________ 17.

______________ 18.

______________ 19.

______________ 20.

______________ 21.

______________ 22.

______________ 23.

______________ 24.

______________ 25.

______________ 26.

______________ 27.

______________ 28.

______________ 29.

______________ 30.

Activity 2 - Place Values and Whole Numbers

Objective(s): This activity will enable participants to identify the place values of whole numbers.

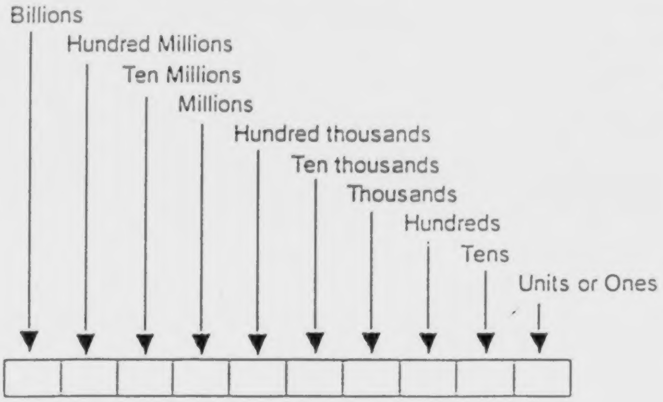
Materials Required:
Pencil

You need to know:

1. Each digit of a number from 0 through 9 has two values:
   A. Face value - what the numeral actually says
   B. Place value - the place (position) of the numeral tells it value

2. The first digit (column) in the extreme right position of a number is called the units digit or units column. The digit in the second position to the left is in the tens column; and the digit in the third location is in the hundreds column, etc. See the diagram below for additional examples of the place names of commonly used digits.

DIGIT PLACE NAMES (WHOLE NUMBERS)


Billions
Hundred Millions
Ten Millions
Millions
Hundred thousands
Ten thousands
Thousands
Hundreds
Tens
Units or Ones

Activity 2 - Place Values and Whole Numbers (continued)

You need to know:

3. Each digit can be assigned a different value depending on its place or position in the number. Example:

thousands	hundreds	tens	units or ones
8	7	6	5
5	6	7	8
7	8	5	6
6	5	8	7

Notice that the 8 in the first number is in the thousands place. That means it is worth 8 thousand. In the second number, the 8 is in the units or ones place. It is worth 8 ones or just plain 8. In the third number, the 8 is in the hundreds place, and it is worth 8 hundred. In the last number, the 8 is in the tens place. That means it is worth 8 tens or 80.

4. Whole numbers represent the sum of individual place values of numerals.

EXAMPLE: 217

$$\begin{array}{rl} 200 & \rightarrow \text{2 hundreds} \\ +\ 10 & \rightarrow \text{1 ten} \\ +\ 7 & \rightarrow \text{7 ones} \\ \hline 217 & \end{array}$$

The whole number 217 is a simple and shortened form of 200 + 10 + 7.

Directions:

On the following page, write the value of the underlined number in the blank.

Activity 2 - Place Values and Whole Numbers (continued)

1. In the number 283, how much is the 8 worth? ________
2. In the number 1,296, how much is the 1 worth? ________
3. In the number 926, how much is the 6 worth? ________
4. In the number 637, how much is the 6 worth? ________
5. In the number 240, how much is the 4 worth? ________
6. In the number 318, how much is the 8 worth? ________
7. In the number 1,873, how much is the 7 worth? ________
8. In the number 8,176, how much is the 8 worth? ________
9. In the number 561, how much is the 5 worth? ________
10. In the number 746,721, how much is the 4 worth? ________
11. In the number 678, how much is the 7 worth? ________
12. In the number 3,016, how much is the 3 worth? ________
13. In the number 235,619, how much is the 2 worth? ________
14. In the number 145,768, how much is the 5 worth? ________

15. The value of 9 in the number 3,739,681 is: ________
16. The value of 7 in the number 873,000 is: ________
17. The value of 6 in the number 6,284,925 is: ________
18. The value of 4 in the number 46,867 is: ________
19. The value of 8 in the number 1,863,745 is: ________
20. The value of 3 in the number 5,632 is: ________
21. The value of 7 in the number 3,754 is: ________
22. The value of 5 in the number 2,385 is: ________
23. The value of 3 in the number 329 is: ________
24. The value of 6 in the number 76 is: ________
25. The value of 4 in the number 64 is: ________

Activity 2 - Place Values and Whole Numbers (continued)

Directions: Fill in the blanks with the correct numbers.

(1) In the number 6,973.....
the value of 3 is _____ ones or _____.
the value of 7 is _____ tens or _____.
the value of 9 is _____ hundreds or _____.
the value of 6 is _____ thouands or _____.

(2) In the number 1,478.....
the value of 8 is _____ ones or _____.
the value of 7 is _____ tens or _____.
the value of 4 is _____ hundreds or _____.
the value of 1 is _____ thousand(s) or _____.

(3) In the number 11,243.....
the value of 3 is _____ ones or _____.
the value of 4 is _____ tens or _____.
the value of 2 is _____ hundreds or _____.
the value of 11 is _____ thousands or _____.

(4) In the number 48,505.....
the value of 5 is _____ ones or _____.
the value of 0 is _____ tens or _____.
the value of 5 is _____ hundreds or _____.
the value of 48 is _____ thousands or _____.

(5) In the number 6,054.....
the value of 4 is _____ ones or _____.
the value of 5 is _____ tens or _____.
the value of 0 is _____ hundreds or _____.
the value of 6 is _____ thousands or _____.

Activity 2 - Place Values and Whole Numbers (continued)

Directions: Fill in the blanks with the correct numbers.

(6) In the number 742.....
the value of 2 is _____ ones or _____.
the value of 4 is _____ tens or _____.
the value of 7 is _____ hundreds or _____.

(7) In the number 8,137.....
the value of 7 is _____ ones or _____.
the value of 3 is _____ tens or _____.
the value of 1 is _____ hundred(s) or _____.
the value of 8 is _____ thousands or _____.

(8) In the number 689.....
the value of 9 is _____ ones or _____.
the value of 8 is _____ tens or _____.
the value of 6 is _____ hundreds or _____.

(9) In the number 38,496.....
the value of 6 is _____ ones or _____.
the value of 9 is _____ tens or _____.
the value of 4 is _____ hundreds or _____.
the value of 38 is _____ thousands or _____.

(10) In the number 379.....
the value of 9 is _____ ones or _____.
the value of 7 is _____ tens or _____.
the value of 3 is _____ hundreds or _____.

Activity 2 - Place Values and Whole Numbers (continued)

Directions: Answer the following by placing the correct digit in the space.

1. 561 Which digit is in the tens place? ________
2. 780 Which digit is in the hundreds place? ________
3. 42,625 Which digit is in the ten thousands place? ________
4. 3,439 Which digit is in the hundreds place? ________
5. 657,524 Which digit is in the thousands place? ________
6. 4,075 Which digit is in the units place? ________
7. 7,302 Wich digit is in the hundreds place? ________
8. 428,713 Which digit is in the hundred thousands place? ________
9. 9,371,246 Which digit is in the millions place? ________
10. 32,584 Which digit is in the units place? ________
11. 529,682 Which digit is in the thousands place? ________
12. 115,035 Which digit is in the hundred thousands place? ________
13. 8,851 Which digit is in the tens place? ________
14. 738,495 Which digit is in the ten thousands place? ________
15. 2,700,920 Which digit is in the millions place? ________

Cluster
Applied Math

Activity 2 - Place Values and Whole Numbers (continued)

Directions: Show the place value of the following numbers by writing the digits correctly on the chart. An example has been completed for you.
EXAMPLE: 7,654

	Millions	Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones
				7	6	5	4
1.							
2.							
3.							
4.							
5.							
6.							
7.							
8.							
9.							
10.							
11.							
12.							
13.							
14.							
15.							
16.							
17.							
18.							
19.							
20.							

Activity 2 - Place Values and Whole Numbers (continued)

EXAMPLE	7,654
1.	6,700
2.	53,426
3.	74,803,000
4.	175
5.	32,072
6.	8,115,035
7.	3,582
8.	493
9.	358,281
10.	1,661
11.	105,302
12.	29,547
13.	284
14.	135,011
15.	22,314
16.	321
17.	387,611
18.	88,027
19.	2,700,920
20.	4,228

Cluster
Applied Math

Activity 3 - Reading and Writing Whole Numbers

Objective(s): This activity will enable participants to read and write whole numbers.

Materials Required:
Pencil

You need to know:

1. Usually the numbers with four digits or more are written with commas after every three digits, counting from right to left.
   EXAMPLE: 71230645
   71,230,645

2. Four-digit numbers are an exception to the rule. Commas are not required in four-digit numbers.
   EXAMPLE: 3743 AND 3,743

   Both are acceptable ways of writing the same number.

3. The numbers in the chart are read as follows:

	Billions	Hundred millions	Ten millions	Millions	Hundred thousands	Ten thousands	Thousands	Hundreds	Tens	Units or Ones
A								4	7	3
B					5	4	3	,9	0	8
C				8	,2	2	3	,0	4	9
D	9	,4	3	0	,5	3	3	,2	4	5

A. Four hundred seventy three. Note that the 4 is in the "hundreds" column, 7 is in the "tens" column, and 3 is in the "ones" column.

B. Six hundred forty-three thousand, nine hundred eight.

C. Eight million, two hundred twenty three thousand, forty nine.

D. Nine billion, four hundred thirty million, five hundred thirty-three thousand, two hundred forty-five.

Activity 3 - Reading and Writing Whole Numbers (continued)

You need to know:

4. Numbers can be written in words, in an expanded form, or as a numeral.

EXAMPLE:
1,689
One thousand, six hundred eighty nine
1000+600+80+9
1,689

Activity 3 - Reading and Writing Whole Numbers (continued)

Directions:

1. At the instructor's request, read the following numbers aloud.

2. On the following page, write out each number in words, in the blanks provided.

1. 8,497
2. 742,351
3. 932,617
4. 7,639,792
5. 25,816
6. 173,855
7. 6,382,523
8. 782,386
9. 1,175,140
10. 97,268
11. 6,973
12. 382
13. 4,880
14. 14,228,786
15. 865
16. 97,268
17. 243
18. 27,268
19. 1,478
20. 257
21. 4,321
22. 28
23. 5,504
24. 457
25. 39
26. 847
27. 386
28. 2,131
29. 159
30. 14
31. 249,382
32. 360
33. 829
34. 247,427,820
35. 37
36. 89,827
37. 22,809
38. 88
39. 738,264,699
40. 758

Activity 3 - Reading and Writing Whole Numbers (continued)

1. ____
2. ____
3. ____
4. ____
5. ____
6. ____
7. ____
8. ____
9. ____
10. ____
11. ____
12. ____
13. ____
14. ____
15. ____
16. ____
17. ____
18. ____
19. ____
20. ____

Activity 3 - Reading and Writing Whole Numbers (continued)

21. ______________________________
22. ______________________________
23. ______________________________
24. ______________________________
25. ______________________________
26. ______________________________
27. ______________________________
28. ______________________________
29. ______________________________
30. ______________________________
31. ______________________________
32. ______________________________
33. ______________________________
34. ______________________________
35. ______________________________
36. ______________________________
37. ______________________________
38. ______________________________
39. ______________________________
40. ______________________________

Activity 3 - Reading and Writing Whole Numbers (continued)

Directions:
Write the following numbers, using figures, in the chart below. Make sure you put each digit in the correct column. Insert commas, where applicable.

	Billions	Hundred Millions	Ten Millions	Millions	Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Units or Ones
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										

1. thirty-four thousand eighty six
2. eight hundred two
3. sixty-three thousand five hundred twenty-two
4. three hundred thirty nine
5. seven thousand seven hundred forty
6. nine million eight hundred twenty-three thousand five hundred twenty-seven
7. five hundred seventy eight
8. one hundred thirty five thousand eight hundred fifty one
9. forty-nine thousand seven hundred thirty-six
10. thirteen million four hundred thirty-six thousand nine hundred thirty-two
11. two thousand five hundred fifteen
12. two hundred four thousand nine hundred seventy-two
13. nine hundred ninety-eight thousand five hundred sixty
14. four thousand eighty-two
15. five thousand one hundred twelve

Activity 4 - Adding Whole Numbers

Objective(s): This activity will enable participants
(1) to add whole numbers in order to find the total amount.
(2) to check addition answers.

Materials Required:
Pencil
Scratch Paper

You need to know:

1. Addition problems are done daily. For example, you might add the "tare" weight and the full weight together, add the proper amount of ingredient when recipes change, or add weights of two ingredients when both are combined in the same bucket.
2. Addition is combining two or more quantities (amounts) to find a total quantity (amount). The answer is called the sum.
3. When adding, the order of the numbers does not matter. For example, 2 + 6 = 6 + 2.
4. To add numbers greater than 10, arrange them in columns and regroup (borrow and carry).
5. To check addition answers, add the columns in the opposite direction. So if you started at the top and added downward, start at the bottom and add upward.

EXAMPLE:

```
 45     (1)  5 + 3 = 8
+33     (2)  4 + 3 = 7
------
 78
```

CHECK:

```
 45     (1)  3 + 5 = 8
+33     (2)  3 + 4 = 7
------
 78
```

Activity 4 - Adding Whole Numbers (continued)

You need to know:

6. To add whole numbers:

A. Write the numbers under one another with each digit in the problem column.

4	6	2	5
	4	2	3
	5	7	4
3	2	5	1

B. Add the ones column:
5+3+4+1=13
Write down the 3 and carry the 1 to the tens column.

		(1)	
4	6	2	5
	4	2	5
	5	7	4
3	2	5	1
			3

C. Add the tens column:
1 (from the ones column) +2+2+7+5=17
Write down the 7 and carry the 1 to the hundreds column.

	(1)	(1)	
4	6	2	5
	4	2	3
	5	7	4
3	2	5	1
		7	3

D. Add the hundreds column:
1 (from the tens column) +6+4+5+2=18
Write down the 8 and carry the 1 to the thousands column.

(1)	(1)	(1)	
4	6	2	5
	4	2	3
	5	7	4
3	2	5	1
	8	7	3

E. Add the thousands column:
1 (from the hundreds column) +4+3=8
Write down the 8. The sum is 8873.

(1)	(1)	(1)	
4	6	2	5
	4	2	3
	5	7	4
3	2	5	1
8	8	7	3

F. Continue the same process with the remaining columns, if applicable.

Cluster
Applied Math

Activity 4 - Adding Whole Numbers

(1) Directions: Add.

1. $\begin{array}{r}3\\+\ 5\\\hline\end{array}$ $\quad$ $\begin{array}{r}5\\+\ 0\\\hline\end{array}$ $\quad$ $\begin{array}{r}2\\+\ 6\\\hline\end{array}$ $\quad$ $\begin{array}{r}1\\+\ 5\\\hline\end{array}$ $\quad$ $\begin{array}{r}0\\+\ 2\\\hline\end{array}$

2. $\begin{array}{r}1\\+\ 8\\\hline\end{array}$ $\quad$ $\begin{array}{r}4\\+\ 5\\\hline\end{array}$ $\quad$ $\begin{array}{r}3\\+\ 5\\\hline\end{array}$ $\quad$ $\begin{array}{r}2\\+\ 6\\\hline\end{array}$ $\quad$ $\begin{array}{r}0\\+\ 8\\\hline\end{array}$

3. $\begin{array}{r}2\\+\ 2\\\hline\end{array}$ $\quad$ $\begin{array}{r}5\\+\ 3\\\hline\end{array}$ $\quad$ $\begin{array}{r}3\\+\ 6\\\hline\end{array}$ $\quad$ $\begin{array}{r}6\\+\ 1\\\hline\end{array}$ $\quad$ $\begin{array}{r}3\\+\ 3\\\hline\end{array}$

4. $\begin{array}{r}1\\+\ 2\\\hline\end{array}$ $\quad$ $\begin{array}{r}4\\+\ 3\\\hline\end{array}$ $\quad$ $\begin{array}{r}1\\+\ 1\\\hline\end{array}$ $\quad$ $\begin{array}{r}5\\+\ 2\\\hline\end{array}$ $\quad$ $\begin{array}{r}4\\+\ 1\\\hline\end{array}$

5. $\begin{array}{r}7\\+\ 1\\\hline\end{array}$ $\quad$ $\begin{array}{r}6\\+\ 3\\\hline\end{array}$ $\quad$ $\begin{array}{r}9\\+\ 0\\\hline\end{array}$ $\quad$ $\begin{array}{r}2\\+\ 7\\\hline\end{array}$ $\quad$ $\begin{array}{r}3\\+\ 4\\\hline\end{array}$

Cluster
Applied Math

Activity 4 - Adding Whole Numbers

(2) Directions: Add.

1.
$$\begin{array}{r}3\\+\;9\\\hline\end{array}\qquad\begin{array}{r}5\\+\;7\\\hline\end{array}\qquad\begin{array}{r}9\\+\;9\\\hline\end{array}\qquad\begin{array}{r}8\\+\;4\\\hline\end{array}\qquad\begin{array}{r}3\\+\;8\\\hline\end{array}$$

2.
$$\begin{array}{r}8\\+\;7\\\hline\end{array}\qquad\begin{array}{r}6\\+\;6\\\hline\end{array}\qquad\begin{array}{r}7\\+\;3\\\hline\end{array}\qquad\begin{array}{r}5\\+\;9\\\hline\end{array}\qquad\begin{array}{r}5\\+\;5\\\hline\end{array}$$

3.
$$\begin{array}{r}4\\+\;6\\\hline\end{array}\qquad\begin{array}{r}9\\+\;2\\\hline\end{array}\qquad\begin{array}{r}7\\+\;6\\\hline\end{array}\qquad\begin{array}{r}5\\+\;6\\\hline\end{array}\qquad\begin{array}{r}4\\+\;9\\\hline\end{array}$$

4.
$$\begin{array}{r}3\\+\;2\\\hline\end{array}\qquad\begin{array}{r}5\\+\;4\\\hline\end{array}\qquad\begin{array}{r}6\\+\;0\\\hline\end{array}\qquad\begin{array}{r}6\\+\;3\\\hline\end{array}\qquad\begin{array}{r}4\\+\;5\\\hline\end{array}$$

5.
$$\begin{array}{r}8\\+\;8\\\hline\end{array}\qquad\begin{array}{r}6\\+\;8\\\hline\end{array}\qquad\begin{array}{r}9\\+\;7\\\hline\end{array}\qquad\begin{array}{r}8\\+\;5\\\hline\end{array}\qquad\begin{array}{r}7\\+\;7\\\hline\end{array}$$

Activity 4 - Adding Whole Numbers

(3) Directions: Add.

1.
$$\begin{array}{r}6\\4\\+\ 5\\\hline\end{array}\qquad\begin{array}{r}9\\6\\+\ 6\\\hline\end{array}\qquad\begin{array}{r}2\\3\\+\ 8\\\hline\end{array}\qquad\begin{array}{r}1\\9\\+\ 4\\\hline\end{array}\qquad\begin{array}{r}6\\2\\+\ 3\\\hline\end{array}$$

2.
$$\begin{array}{r}8\\6\\+\ 7\\\hline\end{array}\qquad\begin{array}{r}7\\0\\+\ 6\\\hline\end{array}\qquad\begin{array}{r}9\\1\\+\ 8\\\hline\end{array}\qquad\begin{array}{r}5\\2\\+\ 2\\\hline\end{array}\qquad\begin{array}{r}8\\5\\+\ 9\\\hline\end{array}$$

3.
$$\begin{array}{r}4\\9\\8\\+\ 1\\\hline\end{array}\qquad\begin{array}{r}5\\6\\7\\+\ 6\\\hline\end{array}\qquad\begin{array}{r}3\\4\\8\\+\ 9\\\hline\end{array}\qquad\begin{array}{r}4\\3\\8\\+\ 8\\\hline\end{array}\qquad\begin{array}{r}9\\7\\3\\+\ 7\\\hline\end{array}$$

4.
$$\begin{array}{r}8\\6\\8\\+\ 4\\\hline\end{array}\qquad\begin{array}{r}3\\2\\7\\+\ 6\\\hline\end{array}\qquad\begin{array}{r}5\\5\\1\\+\ 0\\\hline\end{array}\qquad\begin{array}{r}9\\6\\5\\+\ 7\\\hline\end{array}\qquad\begin{array}{r}6\\7\\2\\+\ 3\\\hline\end{array}$$

Activity 4 - Adding Whole Numbers

(4) Directions: Add.

1.	2	18	3	14	5	61	3	62	5	9
	+ 95	+ 9	+ 35	+ 3	+ 37	+ 5	+ 13	+ 9	+ 36	+ 47
2.	11	15	18	12	17	14	19	16	13	18
	+ 2	+ 9	+ 7	+ 5	+ 8	+ 6	+ 4	+ 1	+ 5	+ 9
3.	72	86	93	2	5	7	84	96	57	3
	+ 4	+ 9	+ 3	+ 75	+ 88	+ 99	+ 1	+ 6	+ 9	+ 37
4.	23	2	21	1	28	7	29	6	26	9
	+ 4	+ 26	+ 3	+ 25	+ 8	+ 24	+ 5	+ 22	+ 8	+ 27
5.	4	5	97	3	2	76	6	7	49	8
	+ 73	+ 89	+ 8	+ 56	+ 66	+ 1	+ 82	+ 94	+ 5	+ 39
6.	48	54	7	78	83	3	41	52	4	28
	+ 6	+ 2	+ 67	+ 9	+ 4	+ 91	+ 1	+ 8	+ 37	+ 6
7.	1	8	7	6	4	2	9	5	3	7
	+ 37	+ 34	+ 32	+ 39	+ 31	+ 35	+ 38	+ 33	+ 36	+ 38

Activity 4 - Adding Whole Numbers

(5) Directions: Add.

1.	1 + 23	6 + 34	42 + 7	59 + 4	9 + 69	2 + 74	87 + 3	98 + 8	3 + 98	5 + 59
2.	41 + 5	1 + 48	42 + 8	2 + 47	44 + 9	7 + 49	46 + 4	6 + 43	48 + 5	9 + 46
3.	29 + 5	33 + 9	1 + 45	8 + 19	22 + 7	36 + 4	2 + 16	6 + 27	64 + 8	5 + 37
4.	5 + 56	52 + 9	1 + 54	59 + 8	7 + 53	4 + 55	58 + 2	51 + 6	9 + 58	53 + 9
5.	3 + 13	27 + 9	36 + 3	45 + 3	3 + 57	8 + 63	2 + 89	95 + 8	38 + 3	7 + 26
6.	5 + 46	51 + 1	2 + 65	17 + 8	9 + 24	38 + 7	4 + 43	57 + 6	9 + 75	47 + 6
7.	62 + 1	66 + 6	7 + 61	4 + 67	69 + 9	64 + 2	3 + 68	5 + 65	64 + 6	68 + 6

Activity 4 - Adding Whole Numbers

(6) Directions: Add.

1.	25	8	49	6	63	2	12	5	39	7
	+ 1	+ 31	+ 7	+ 58	+ 4	+ 77	+ 9	+ 28	+ 6	+ 38
2.	6	72	76	9	4	77	88	8	9	6
	+ 75	+ 2	+ 7	+ 73	+ 78	+ 5	+ 5	+ 86	+ 84	+ 45
3.	11	26	32	47	53	64	79	85	96	37
	+ 9	+ 7	+ 5	+ 8	+ 6	+ 4	+ 3	+ 1	+ 2	+ 5
4.	87	7	4	9	99	93	97	6	5	7
	+ 6	+ 85	+ 92	+ 96	+ 3	+ 2	+ 7	+ 98	+ 98	+ 96
5.	4	2	3	1	8	7	5	6	9	8
	+ 15	+ 21	+ 39	+ 44	+ 55	+ 68	+ 71	+ 81	+ 89	+ 46
6.	23	9	42	7	69	8	97	9	9	97
	+ 6	+ 34	+ 7	+ 59	+ 4	+ 77	+ 5	+ 95	+ 88	+ 9
7.	1	5	2	3	6	5	2	9	8	6
	30	47	81	25	52	83	56	37	36	84
	+ 9	+ 8	+ 5	+ 6	+ 9	+ 4	+ 5	+ 8	+ 7	+ 5

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Applied Math

Activity 4 - Adding Whole Numbers

(7) **Rows 1 - 5** Directions: Add and check

1.	38 + 21	57 + 32	45 + 3	32 + 25
2.	28 + 49	83 + 46	37 + 86	29 + 45
3.	68 + 49	56 + 71	64 + 28	39 + 42
4.	37 + 22	59 + 76	83 + 24	55 + 99
5.	93 + 14	26 + 53	29 + 84	53 + 28

Cluster
Applied Math

Activity 4 - Adding Whole Numbers

(7) **Rows 6- 10** Directions: Add and check

6.	$\begin{array}{r}42\\+\ 54\\\hline\end{array}$	$\begin{array}{r}34\\+\ 28\\\hline\end{array}$	$\begin{array}{r}37\\+\ 61\\\hline\end{array}$	$\begin{array}{r}24\\+\ 13\\\hline\end{array}$
7.	$\begin{array}{r}28\\+\ 73\\\hline\end{array}$	$\begin{array}{r}53\\+\ 68\\\hline\end{array}$	$\begin{array}{r}67\\+\ 31\\\hline\end{array}$	$\begin{array}{r}13\\+\ 78\\\hline\end{array}$
8.	$\begin{array}{r}31\\+\ 28\\\hline\end{array}$	$\begin{array}{r}93\\+\ 15\\\hline\end{array}$	$\begin{array}{r}59\\+\ 83\\\hline\end{array}$	$\begin{array}{r}82\\+\ 71\\\hline\end{array}$
9.	$\begin{array}{r}47\\+\ 26\\\hline\end{array}$	$\begin{array}{r}93\\+\ 28\\\hline\end{array}$	$\begin{array}{r}66\\+\ 32\\\hline\end{array}$	$\begin{array}{r}28\\+\ 48\\\hline\end{array}$
10.	$\begin{array}{r}65\\+\ 27\\\hline\end{array}$	$\begin{array}{r}47\\+\ 68\\\hline\end{array}$	$\begin{array}{r}74\\+\ 16\\\hline\end{array}$	$\begin{array}{r}55\\+\ 29\\\hline\end{array}$

Cluster
Applied Math

Activity 4 - Adding Whole Numbers

(7) **Rows 11 - 15** Directions: Add and check

11.	84 + 29	55 + 89	83 + 15	25 + 39
12.	19 + 47	82 + 36	31 + 45	74 + 26
13.	64 + 28	23 + 88	65 + 87	56 + 49
14.	75 + 78	43 + 88	39 + 29	74 + 23
15.	98 + 43	39 + 26	93 + 28	96 + 16

Activity 4 - Adding Whole Numbers

(7) **Rows 16 - 20** Directions: Add and check

16.	66 + 45	24 + 63	57 + 14	92 + 79
17.	61 + 26	65 + 27	48 + 56	14 + 2
18.	32 + 19	39 + 87	29 + 50	47 + 24
19.	13 + 41	59 + 26	25 + 3	17 + 79
20.	72 + 24	44 + 36	46 + 2	38 + 25

Activity 4 - Adding Whole Numbers

(8) **Rows 1 - 5** Directions: Add and check.

1. $\begin{array}{r} 78 \\ +\ \underline{25} \end{array}$ $\qquad$ $\begin{array}{r} 37 \\ +\ \underline{69} \end{array}$ $\qquad$ $\begin{array}{r} 82 \\ +\ \underline{14} \end{array}$

2. $\begin{array}{r} 59 \\ +\ \underline{67} \end{array}$ $\qquad$ $\begin{array}{r} 32 \\ +\ \underline{49} \end{array}$ $\qquad$ $\begin{array}{r} 55 \\ +\ \underline{63} \end{array}$

3. $\begin{array}{r} 23 \\ +\ \underline{89} \end{array}$ $\qquad$ $\begin{array}{r} 74 \\ +\ \underline{25} \end{array}$ $\qquad$ $\begin{array}{r} 93 \\ +\ \underline{25} \end{array}$

4. $\begin{array}{r} 61 \\ +\ \underline{28} \end{array}$ $\qquad$ $\begin{array}{r} 24 \\ +\ \underline{57} \end{array}$ $\qquad$ $\begin{array}{r} 28 \\ +\ \underline{16} \end{array}$

5. $\begin{array}{r} 54 \\ +\ \underline{78} \end{array}$ $\qquad$ $\begin{array}{r} 69 \\ +\ \underline{23} \end{array}$ $\qquad$ $\begin{array}{r} 51 \\ +\ \underline{28} \end{array}$

Activity 4 - Adding Whole Numbers

(8) **Rows 6 - 10** Directions: Add and check.

6.	$\begin{array}{r} 73 \\ +\underline{69} \end{array}$	$\begin{array}{r} 84 \\ +\underline{28} \end{array}$	$\begin{array}{r} 62 \\ +\underline{48} \end{array}$
7.	$\begin{array}{r} 87 \\ +\underline{91} \end{array}$	$\begin{array}{r} 48 \\ +\underline{26} \end{array}$	$\begin{array}{r} 53 \\ +\underline{97} \end{array}$
8.	$\begin{array}{r} 68 \\ +\underline{54} \end{array}$	$\begin{array}{r} 83 \\ +\underline{17} \end{array}$	$\begin{array}{r} 75 \\ +\underline{29} \end{array}$
9.	$\begin{array}{r} 74 \\ +\underline{28} \end{array}$	$\begin{array}{r} 68 \\ +\underline{93} \end{array}$	$\begin{array}{r} 95 \\ +\underline{82} \end{array}$
10.	$\begin{array}{r} 46 \\ +\underline{83} \end{array}$	$\begin{array}{r} 72 \\ +\underline{96} \end{array}$	$\begin{array}{r} 47 \\ +\underline{84} \end{array}$

Activity 4 - Adding Whole Numbers

(8) **Rows 11 - 15** Directions: Add and check

11.	92 + 15	73 + 16	29 + 33	34 + 69
12.	45 + 57	63 + 98	37 + 69	84 + 57
13.	36 + 83	24 + 47	71 + 98	64 + 36
14.	49 + 87	63 + 29	62 + 79	65 + 97
15.	26 + 75	38 + 44	83 + 29	58 + 46

Activity 4 - Adding Whole Numbers

(9) Directions: Add and check.

1.

$$\begin{array}{r} 68 \\ +\ 580 \\ \hline \end{array} \qquad \begin{array}{r} 72 \\ +\ 469 \\ \hline \end{array} \qquad \begin{array}{r} 93 \\ +\ 708 \\ \hline \end{array} \qquad \begin{array}{r} 87 \\ +\ 506 \\ \hline \end{array}$$

2.

$$\begin{array}{r} 748 \\ +\ 87 \\ \hline \end{array} \qquad \begin{array}{r} 825 \\ +\ 59 \\ \hline \end{array} \qquad \begin{array}{r} 346 \\ +\ 64 \\ \hline \end{array} \qquad \begin{array}{r} 293 \\ +\ 53 \\ \hline \end{array}$$

3.

$$\begin{array}{r} 41 \\ +\ 289 \\ \hline \end{array} \qquad \begin{array}{r} 57 \\ +\ 418 \\ \hline \end{array} \qquad \begin{array}{r} 53 \\ +\ 469 \\ \hline \end{array} \qquad \begin{array}{r} 64 \\ +\ 377 \\ \hline \end{array}$$

4.

$$\begin{array}{r} 302 \\ +\ 83 \\ \hline \end{array} \qquad \begin{array}{r} 729 \\ +\ 50 \\ \hline \end{array} \qquad \begin{array}{r} 655 \\ +\ 43 \\ \hline \end{array}$$

Activity 4 - Adding Whole Numbers

(10) Directions: Add and check.

1.	56 + 811	34 + 205	80 + 709	482 + 16
2.	314 + 98	283 + 56	607 + 95	966 + 35
3.	53 + 436	13 + 206	62 + 914	47 + 532
4.	946 + 32	415 + 61	723 + 75	

Activity 4 - Adding Whole Numbers

(11) Directions: Add and check.

1.

$$\begin{array}{r} 66 \\ 81 \\ +\ \ 56 \\ \hline \end{array} \qquad \begin{array}{r} 21 \\ 49 \\ +\ \ 43 \\ \hline \end{array} \qquad \begin{array}{r} 89 \\ 67 \\ +\ \ 50 \\ \hline \end{array} \qquad \begin{array}{r} 92 \\ 10 \\ +\ \ 39 \\ \hline \end{array}$$

2.

$$\begin{array}{r} 87 \\ 19 \\ +\ \ 72 \\ \hline \end{array} \qquad \begin{array}{r} 60 \\ 54 \\ +\ \ 38 \\ \hline \end{array} \qquad \begin{array}{r} 31 \\ 28 \\ +\ \ 44 \\ \hline \end{array} \qquad \begin{array}{r} 79 \\ 96 \\ +\ \ 83 \\ \hline \end{array}$$

3.

$$\begin{array}{r} 70 \\ 57 \\ +\ \ 202 \\ \hline \end{array} \qquad \begin{array}{r} 51 \\ 91 \\ +\ \ 329 \\ \hline \end{array} \qquad \begin{array}{r} 42 \\ 93 \\ +\ \ 516 \\ \hline \end{array} \qquad \begin{array}{r} 78 \\ 12 \\ +\ \ 490 \\ \hline \end{array}$$

4.

$$\begin{array}{r} 63 \\ 85 \\ +\ \ 854 \\ \hline \end{array} \qquad \begin{array}{r} 84 \\ 43 \\ +\ \ 977 \\ \hline \end{array} \qquad \begin{array}{r} 20 \\ 74 \\ +\ \ 627 \\ \hline \end{array} \qquad \begin{array}{r} 95 \\ 80 \\ +\ \ 417 \\ \hline \end{array}$$

Activity 4 - Adding Whole Numbers

(12) Directions: Add and check.

1.
$$\begin{array}{r} 91 \\ 31 \\ 78 \\ +\ 66 \\ \hline \end{array} \qquad \begin{array}{r} 15 \\ 75 \\ 76 \\ +\ 31 \\ \hline \end{array} \qquad \begin{array}{r} 23 \\ 22 \\ 87 \\ +\ 99 \\ \hline \end{array}$$

2.
$$\begin{array}{r} 646 \\ 60 \\ 52 \\ +\ 944 \\ \hline \end{array} \qquad \begin{array}{r} 930 \\ 15 \\ 37 \\ +\ 376 \\ \hline \end{array} \qquad \begin{array}{r} 347 \\ 38 \\ 67 \\ +\ 421 \\ \hline \end{array}$$

3.
$$\begin{array}{r} 94 \\ 21 \\ 39 \\ 45 \\ +\ 80 \\ \hline \end{array} \qquad \begin{array}{r} 40 \\ 83 \\ 26 \\ 29 \\ +\ 33 \\ \hline \end{array} \qquad \begin{array}{r} 27 \\ 40 \\ 67 \\ 28 \\ +\ 86 \\ \hline \end{array}$$

4.
$$\begin{array}{r} 57 \\ 35 \\ 12 \\ 83 \\ +\ 58 \\ \hline \end{array} \qquad \begin{array}{r} 43 \\ 51 \\ 74 \\ 32 \\ +\ 36 \\ \hline \end{array} \qquad \begin{array}{r} 86 \\ 65 \\ 84 \\ 46 \\ +\ 97 \\ \hline \end{array}$$

Activity 4 - Adding Whole Numbers

(13) **Rows 1- 5** Directions: Add and check.

1.	603	577	458	413
	+ 285	+ 321	+ 201	+ 564
2.	805	761	432	854
	+ 163	+ 135	+ 245	+ 133
3.	345	254	829	378
	+ 698	+ 736	+ 847	+ 692
4.	748	293	786	267
	+ 642	+ 718	+ 692	+ 541
5.	843	298	674	235
	+ 927	+ 354	+ 732	+ 872

Activity 4 - Adding Whole Numbers

(13) **Rows 6 - 10** Directions: Add and check.

6.	762 + 125	210 + 648	307 + 652	386 + 402	138 + 844
7.	328 + 560	415 + 383	574 + 692	925 + 381	558 + 649
8.	493 + 386	254 + 255	368 + 645	758 + 452	423 + 468
9.	475 + 321	347 + 433	425 + 716	129 + 632	
10.	328 + 972	523 + 476	215 + 256	548 + 627	

Activity 4 - Adding Whole Numbers

(14) **Rows 1 - 5** Directions: Add and check.

1.	786 + 394	928 + 782	475 + 698	378 + 257
2.	378 + 269	543 + 786	834 + 729	541 + 269
3.	287 + 465	387 + 298	546 + 589	728 + 569
4.	384 + 429	968 + 518	652 + 478	409 + 583
5.	740 + 893	584 + 427	637 + 905	842 + 369

Activity 4 - Adding Whole Numbers

(14) **Rows 6 - 11** Directions: Add and check.

6.	683 + 417	257 + 683	594 + 417	267 + 936
7.	405 + 561	216 + 423	537 + 252	640 + 118
8.	689 + 836	546 + 921	786 + 293	548 + 687
9.	834 + 785	692 + 847	716 + 263	408 + 241
10.	715 + 486	709 + 983	607 + 406	219 + 389
11.	885 + 102	235 + 452		

Activity 4 - Adding Whole Numbers

(16) Directions: Add and check.

1.
$$\begin{array}{r}146\\73\\+\ 718\\\hline\end{array}\qquad\begin{array}{r}243\\10\\+\ 256\\\hline\end{array}\qquad\begin{array}{r}880\\77\\+\ 523\\\hline\end{array}$$

2.
$$\begin{array}{r}367\\520\\+\ 124\\\hline\end{array}\qquad\begin{array}{r}236\\153\\+\ 875\\\hline\end{array}\qquad\begin{array}{r}413\\648\\+\ 381\\\hline\end{array}\qquad\begin{array}{r}223\\209\\+\ 574\\\hline\end{array}$$

3.
$$\begin{array}{r}175\\263\\+\ 421\\\hline\end{array}\qquad\begin{array}{r}357\\113\\+\ 318\\\hline\end{array}\qquad\begin{array}{r}526\\683\\+\ 347\\\hline\end{array}\qquad\begin{array}{r}162\\842\\+\ 682\\\hline\end{array}\qquad\begin{array}{r}845\\464\\+\ 573\\\hline\end{array}$$

4.
$$\begin{array}{r}316\\470\\+\ 211\\\hline\end{array}\qquad\begin{array}{r}214\\275\\+\ 463\\\hline\end{array}\qquad\begin{array}{r}817\\646\\+\ 373\\\hline\end{array}\qquad\begin{array}{r}552\\673\\+\ 631\\\hline\end{array}\qquad\begin{array}{r}621\\897\\+\ 973\\\hline\end{array}$$

Activity 4 - Adding Whole Numbers

(17) Directions: Use scratch paper to add these numbers. Use your calculator to check your answers.

1.

685	597	263	760	461	298
691	283	161	218	919	709
274	406	247	322	653	395
+ 394	+ 938	+ 459	+ 938	+ 597	+ 471

2.

518	114	806	638	441
782	726	992	793	348
764	953	528	136	635
207	199	666	483	914
+ 843	+ 727	+ 894	+ 397	+ 679

3.

272	944	357
107	775	106
814	753	197
760	107	371
591	779	810
467	107	849
157	811	693
+ 724	+ 661	+ 556

4.

494	165	618
847	559	622
511	428	159
577	135	285
905	650	341
699	417	375
359	505	662
+ 424	+ 876	+ 996

Activity 4 - Adding Whole Numbers

(18) Directions: Add and check.

1. $\begin{array}{r} 8,027 \\ + \ 1,932 \\ \hline \end{array}$ $\qquad$ $\begin{array}{r} 3,329 \\ + \ 4,060 \\ \hline \end{array}$ $\qquad$ $\begin{array}{r} 6,203 \\ + \ 2,351 \\ \hline \end{array}$

2. $\begin{array}{r} 6,001 \\ + \ 2,573 \\ \hline \end{array}$ $\qquad$ $\begin{array}{r} 2,347 \\ + \ 2,412 \\ \hline \end{array}$ $\qquad$ $\begin{array}{r} 7,580 \\ + \ 1,316 \\ \hline \end{array}$

3. $\begin{array}{r} 4,825 \\ + \ 3,054 \\ \hline \end{array}$ $\qquad$ $\begin{array}{r} 1,756 \\ + \ 6,213 \\ \hline \end{array}$ $\qquad$ $\begin{array}{r} 6,073 \\ + \ 2,515 \\ \hline \end{array}$

4. $\begin{array}{r} 4,815 \\ + \ 2,114 \\ \hline \end{array}$ $\qquad$ $\begin{array}{r} 8,047 \\ + \ 1,832 \\ \hline \end{array}$ $\qquad$ $\begin{array}{r} 1,966 \\ + \ 4,032 \\ \hline \end{array}$

5. $\begin{array}{r} 4,116 \\ + \ 4,572 \\ \hline \end{array}$ $\qquad$ $\begin{array}{r} 7,038 \\ + \ 2,521 \\ \hline \end{array}$ $\qquad$ $\begin{array}{r} 2,413 \\ + \ 4,334 \\ \hline \end{array}$

6. $\begin{array}{r} 4,261 \\ + \ 3,428 \\ \hline \end{array}$ $\qquad$ $\begin{array}{r} 2,352 \\ + \ 6,043 \\ \hline \end{array}$ $\qquad$ $\begin{array}{r} 7,084 \\ + \ 2,713 \\ \hline \end{array}$

Activity 4 - Adding Whole Numbers

(19) Directions: Add and check.

1.	7,244 + 2,351	8,563 + 1,234	5,042 + 2,635
2.	4,162 + 5,736	2,438 + 4,235	7,654 + 3,476
3.	4,651 + 3,238	3,527 + 1,417	6,355 + 3,846
4.	7,136 + 1,042	3,574 + 3,103	5,546 + 2,342
5.	2,746 + 8,337	8,437 + 5,895	4,825 + 2,164
6.	9,223 + 4,439	7,558 + 6,796	3,251 + 4,748

Activity 4 - Adding Whole Numbers

(20) Directions: Add and check.

1. $$\begin{array}{r} 2{,}562 \\ 3{,}114 \\ +\ 3{,}201 \\ \hline \end{array} \qquad \begin{array}{r} 4{,}658 \\ 3{,}226 \\ +\ 1{,}814 \\ \hline \end{array} \qquad \begin{array}{r} 5{,}673 \\ 2{,}225 \\ +\ 3{,}070 \\ \hline \end{array}$$

2. $$\begin{array}{r} 4{,}124 \\ 3{,}251 \\ +\ 1{,}524 \\ \hline \end{array} \qquad \begin{array}{r} 2{,}543 \\ 6{,}671 \\ +\ 1{,}187 \\ \hline \end{array} \qquad \begin{array}{r} 7{,}338 \\ 3{,}229 \\ +\ 6{,}360 \\ \hline \end{array}$$

3. $$\begin{array}{r} 8{,}779 \\ 2{,}286 \\ +\ 5{,}269 \\ \hline \end{array} \qquad \begin{array}{r} 4{,}855 \\ 2{,}849 \\ +\ 1{,}754 \\ \hline \end{array} \qquad \begin{array}{r} 7{,}630 \\ 4{,}108 \\ +\ 7{,}068 \\ \hline \end{array}$$

4. $$\begin{array}{r} 8{,}493 \\ 7{,}601 \\ +\ 2{,}519 \\ \hline \end{array} \qquad \begin{array}{r} 4{,}181 \\ 7{,}670 \\ +\ 2{,}892 \\ \hline \end{array} \qquad \begin{array}{r} 4{,}596 \\ 8{,}892 \\ +\ 4{,}625 \\ \hline \end{array}$$

5. $$\begin{array}{r} 9{,}478 \\ 6{,}791 \\ +\ 5{,}912 \\ \hline \end{array} \qquad \begin{array}{r} 3{,}997 \\ 9{,}254 \\ +\ 4{,}529 \\ \hline \end{array} \qquad \begin{array}{r} 5{,}504 \\ 2{,}741 \\ +\ 3{,}116 \\ \hline \end{array}$$

Activity 4 - Adding Whole Numbers

(21) Directions: Use scratch paper to add these numbers. Use your calculator to check your answer.

1.

$$\begin{array}{r} 3{,}948 \\ 7{,}758 \\ 6{,}799 \\ +\ 2{,}437 \\ \hline \end{array} \qquad \begin{array}{r} 6{,}787 \\ 3{,}316 \\ 4{,}213 \\ +\ 5{,}449 \\ \hline \end{array}$$

2.

$$\begin{array}{r} 8{,}123 \\ 7{,}510 \\ 1{,}085 \\ 6{,}534 \\ 9{,}469 \\ 3{,}638 \\ +\ 1{,}086 \\ \hline \end{array} \qquad \begin{array}{r} 2{,}774 \\ 7{,}887 \\ 3{,}551 \\ 4{,}560 \\ 5{,}494 \\ 1{,}745 \\ +\ 8{,}361 \\ \hline \end{array}$$

3.

$$\begin{array}{r} 8{,}649 \\ 7{,}856 \\ 4{,}822 \\ 4{,}776 \\ 6{,}252 \\ 2{,}791 \\ +\ 8{,}679 \\ \hline \end{array} \qquad \begin{array}{r} 7{,}099 \\ 9{,}592 \\ 3{,}683 \\ 9{,}971 \\ 1{,}617 \\ 2{,}193 \\ +\ 8{,}062 \\ \hline \end{array}$$

4.

$$\begin{array}{r} 4{,}108 \\ 7{,}915 \\ 3{,}736 \\ +\ 2{,}615 \\ \hline \end{array} \qquad \begin{array}{r} 9{,}081 \\ 8{,}752 \\ 2{,}978 \\ +\ 7{,}093 \\ \hline \end{array}$$

Activity 4 - Adding Whole Numbers

(22) Directions: Add and check.

1.	24,207 + 15,072	54,156 + 30,422	32,854 + 43,104
2.	14,871 + 65,118	75,854 + 24,357	40,955 + 46,365
3.	36,745 + 42,031	56,092 + 23,805	72,033 + 21,563
4.	51,084 + 27,505	69,043 + 20,516	23,864 + 51,133
5.	25,401 + 22,367	86,996 + 97,668	27,514 + 22,384

Activity 4 - Adding Whole Numbers

(23) Directions: Add and check.

1. $\begin{array}{r} 21{,}513 \\ +\ 62{,}375 \\ \hline \end{array}$ $\quad$ $\begin{array}{r} 63{,}285 \\ +\ 24{,}926 \\ \hline \end{array}$ $\quad$ $\begin{array}{r} 32{,}643 \\ +\ 20{,}898 \\ \hline \end{array}$

2. $\begin{array}{r} 18{,}946 \\ +\ 51{,}032 \\ \hline \end{array}$ $\quad$ $\begin{array}{r} 70{,}128 \\ +\ 16{,}641 \\ \hline \end{array}$ $\quad$ $\begin{array}{r} 54{,}223 \\ +\ 32{,}564 \\ \hline \end{array}$

3. $\begin{array}{r} 51{,}937 \\ +\ 35{,}042 \\ \hline \end{array}$ $\quad$ $\begin{array}{r} 69{,}821 \\ +\ 20{,}104 \\ \hline \end{array}$ $\quad$ $\begin{array}{r} 30{,}649 \\ +\ 54{,}320 \\ \hline \end{array}$

4. $\begin{array}{r} 58{,}971 \\ +\ 28{,}099 \\ \hline \end{array}$ $\quad$ $\begin{array}{r} 72{,}064 \\ +\ 27{,}248 \\ \hline \end{array}$ $\quad$ $\begin{array}{r} 38{,}684 \\ +\ 20{,}314 \\ \hline \end{array}$

5. $\begin{array}{r} 76{,}521 \\ +\ 13{,}054 \\ \hline \end{array}$

Cluster
Applied Math

Activity 4 - Adding Whole Numbers

(24) Directions: Add and check.

1.

$$\begin{array}{r} 52{,}364 \\ +\quad 2{,}305 \\ \hline \end{array} \qquad \begin{array}{r} 35{,}086 \\ +\quad 1{,}213 \\ \hline \end{array} \qquad \begin{array}{r} 20{,}316 \\ +\quad 8{,}271 \\ \hline \end{array}$$

2.

$$\begin{array}{r} 86{,}954 \\ 21{,}326 \\ +\ 40{,}579 \\ \hline \end{array} \qquad \begin{array}{r} 29{,}847 \\ 31{,}866 \\ +\ 49{,}230 \\ \hline \end{array} \qquad \begin{array}{r} 59{,}146 \\ 28{,}759 \\ +\ 61{,}238 \\ \hline \end{array}$$

3.

$$\begin{array}{r} 76{,}493 \\ 66{,}590 \\ +\ 27{,}286 \\ \hline \end{array} \qquad \begin{array}{r} 44{,}538 \\ 64{,}908 \\ +\ 70{,}435 \\ \hline \end{array} \qquad \begin{array}{r} 27{,}881 \\ 92{,}855 \\ +\ 33{,}064 \\ \hline \end{array}$$

4.

$$\begin{array}{r} 43{,}972 \\ 61{,}258 \\ +\ 30{,}417 \\ \hline \end{array} \qquad \begin{array}{r} 69{,}836 \\ 71{,}234 \\ +\ 33{,}927 \\ \hline \end{array} \qquad \begin{array}{r} 75{,}634 \\ 32{,}408 \\ +\ 21{,}046 \\ \hline \end{array}$$

5.

$$\begin{array}{r} 27{,}290 \\ +\quad 2{,}607 \\ \hline \end{array} \qquad \begin{array}{r} 54{,}763 \\ +\quad 4{,}134 \\ \hline \end{array}$$

Activity 4 - Adding Whole Numbers

(25) Directions: Add and check.

1.	392,844	693,295	476,698
	+ 547,276	+ 248,708	+ 781,786
2.	646,245	665,014	236,980
	+ 695,048	+ 959,084	+ 346,706
3.	683,945	382,769	473,586
	+ 821,596	+ 737,892	+ 469,218
4.	596,868	998,273	610,199
	+ 243,117	+ 289,713	+ 583,045
5.	592,768		
	+ 409,826		

Activity 4 - Adding Whole Numbers

(26) Directions: Add and check.

1. $\begin{array}{r} 642{,}865 \\ +\ 921{,}565 \\ \hline \end{array}$ $\qquad$ $\begin{array}{r} 784{,}228 \\ +\ 843{,}627 \\ \hline \end{array}$ $\qquad$ $\begin{array}{r} 372{,}486 \\ +\ 687{,}769 \\ \hline \end{array}$

2. $\begin{array}{r} 662{,}184 \\ +\ 234{,}013 \\ \hline \end{array}$ $\qquad$ $\begin{array}{r} 729{,}832 \\ +\ 240{,}144 \\ \hline \end{array}$ $\qquad$ $\begin{array}{r} 229{,}056 \\ +\ 500{,}832 \\ \hline \end{array}$

3. $\begin{array}{r} 367{,}455 \\ +\ 422{,}301 \\ \hline \end{array}$ $\qquad$ $\begin{array}{r} 294{,}391 \\ +\ 748{,}692 \\ \hline \end{array}$ $\qquad$ $\begin{array}{r} 249{,}382 \\ +\ 389{,}827 \\ \hline \end{array}$

4. $\begin{array}{r} 831{,}476 \\ +\ 978{,}937 \\ \hline \end{array}$ $\qquad$ $\begin{array}{r} 210{,}976 \\ +\ 384{,}012 \\ \hline \end{array}$ $\qquad$ $\begin{array}{r} 861{,}042 \\ +\ 121{,}446 \\ \hline \end{array}$

5. $\begin{array}{r} 478{,}695 \\ 341{,}217 \\ \hline \end{array}$

Activity 4 - Adding Whole Numbers

(27) Directions: Use scratch paper to add these numbers. Use your calculator to check your answers.

1.	423,876,982 + 839,213,469	476,827,698 + 928,022,809	247,692,385 + 786,427,820
2.	738,925,467 + 426,178,698	293,847,693 + 542,769,827	786,925,478 + 354,769,842
3.	742,618,726 + 427,864,415	427,893,876 + 738,264,699	924,647,822 + 376,256,878
4.	725,678,296 + 854,927,707	537,698,276 + 654,276,987	547,692,859 + 382,769,842

Activity 5 - Solving Word Problems (Addition)

Objective(s): This activity will enable participants to solve word problems by applying addition skills.

Materials Required:
Pencil

You need to know:

To solve any word problem....

1. Determine what you must find out.

2. Decide what information is necessary in order to solve the problem.

3. Decide what arithmetic operation to use. Since clue words give you the key to solving the problem, pay particular attention to them.

   EXAMPLES:

   in all
   together
   altogether
   total
   both
   combined

   sum
   more
   plus
   and
   added
   increase

   → TO ADD

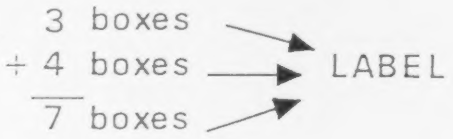
4. Work out the problem and find the solution.

5. Check your arithmetic. Reread the question to make sure that your answer makes sense.

Activity 5 - Solving Word Problems (continued)

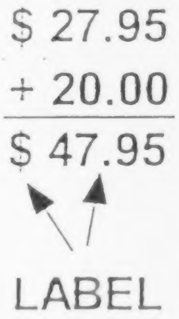
You need to know:

6. Label final answers in order to make the numbers concrete.
   EXAMPLES:
   Ralph ate 3 boxes of Better Cheddars® last week and 4 boxes this week. How many boxes did he eat altogether?


3 boxes
+ 4 boxes
7 boxes
LABEL

Not just 7, but 7 boxes (final answer).

A uniform costs $27.95 and an identification badge costs $20.00. How much did Henry pay for work attire?


$ 27.95
+ 20.00
$ 47.95
LABEL

Not just 47.95, but $47.95 (final answer).

Activity 5 - Solving Word Problems (continued)

Directions: Read the word problems below and perform the necessary addition computations to answer the questions that follow.

1. An urban supermarket bought four shipments of Chips Ahoy!® cookies. The first shipment contained 87 cartons, the second 135, the third 111, and the fourth 215. In all, how many cartons were bought? __________

2. Annie, a packing technician, drives to Nabisco from various places and back home each evening. Her records show the following mileage for one week: 58 miles, 45 miles, 62 miles, 31 miles, and 79 miles. What was her total mileage for the week? __________

3. In the Bakery cafeteria, Rob bought a hamburger which costs \$1.95, a bag of chips for \$.65, and a large grape soda for \$.93. How much did his lunch cost? __________

4. Bill and Carol Brown keep a record of the amount of gasoline they use to drive back and forth to Nabisco®. Last month they purchased the following number of gallons: 9, 13, 14, 10, 12, and 14. How many gallons did they purchase during the month?

   ____

Activity 5 - Solving Word Problems (continued)

5. To reward employees for their outstanding record, Nabisco® management sponsored a luncheon. The following amounts of food were purchased: 110 pounds of hotdogs, 215 pounds of hamburger, 95 pounds of potato salad, 60 pounds of baked beans, and 48 pounds of coleslaw. Altogether, how many pounds of food were purchased? __________

6. During the luncheon, 283 employees were served the first hour, 170 the second hour, 82 the third hour, and 306 the fourth hour. What was the total number of employees served? __________

7. At the Richmond Bakery, the first shift produced 2,000,000 Premium® crackers, the second shift produced 1,743,562, and the third shift produced 1,928,637. How many crackers were produced on this day? __________

8. If 5,000,000 Ritz® crackers can be produced per shift, 2,000,000 Premium® crackers. and 2,400,000 Oreos®, combined how many cookies and crackers can be produced per shift? __________

Activity 5 - Solving Word Problems (continued)

9. Following are the pounds of B&R produced by each production line. What was the total amount of B&R produced for the day? ____________

Line 1: 212
Line 2: 178
Line 3: 427
Line 4: 192
Line 5: 310
Line 6: 253
Line 7: 404

10. One Thursday, line 1 produced 698 bundles of product, line 2 produced 737 bundles, line 3 produced 834 bundles, and line 4 produced 555 bundles. What was the total number of bundles produced for the day? ____________

11. Following are the number of Nilla Wafer® units rejected by each fill machine on line 5, shift two. How many units were rejected during the shift? ____________

Fill Machine 1: 12
Fill Machine 2: 23
Fill Machine 3: 16
Fill Machine 4: 67

Activity 5 - Solving Word Problems (continued)

12. One Tuesday, three lines produced Wheat Thins®. Line 2 produced 8,983 units, line 5 produced 9,876 units, and line 7 produced 9,495 units. How many units were produced altogether? ___________

13. It is 6:17 p.m. and you have to relieve one of the Assemblers in 38 minutes. What time will you arrive to relieve him?

____

14. Ray travels through a tunnel which costs $1.35 each way in order to get to and from work at Nabisco®. How much money does he spend to get through the tunnel daily? ___________

15. During a one-hour period, fill machine 1 filled 786 boxes, fill machine 2 filled 993 boxes, and fill machine 3 filled 884 boxes. How many boxes were filled by all three machines? ___________

Activity 5 - Solving Word Problems (continued)

16. Over a one-month period, a bakery produced the following number of pounds of B&R: 29,387, 32,740, 26,513 and 30,200. How many pounds of B&R were produced in all during the month? ___________.

17. Following are the slug weights for five Chips Ahoy!® slugs (in grams). What is the total weight of the slugs? ___________

253.1 246.7 266.5 258.3 260.9

18. On Wednesday, line 1 produced 374 pounds of B&R, line 2 produced 226 pounds, line 3 produced 427 pounds, and line 4 produced 452 pounds. What was the total amount of B&R produced for the day? ___________

19. One Monday, shift 1 produced 634 doughs, shift 2 produced 606 doughs, and shift 3 produced 578 doughs. How many doughs were produced for the day? ___________

Activity 5 - Solving Word Problems (continued)

20. Calculate the cumulative totals.

Pounds of B&R produced

Shift 1: 643

Shift 2: 376 Cumulative total = ___________

Shift 3: 485 Cumulative total = ___________

21. Calculate the cumulative totals.

Number of Wheat Thin® units produced by line 1:

Shift 1: 5,432

Shift 2: 4,987 Cumulative total = ___________

Shift 3: 5,321 Cumulative total = ___________

22. Following are the net weights of five packages of Chips Ahoy!®. What is the total net weight? ___________

16.33 16.54 16.70 16.06 16.35

Activity 6 - Subtraction of Whole Numbers

Objective(s): This activity will enable participants to (1) apply the rules for subtracting whole numbers and (2) check the answers to subtraction problems.

Materials Required:
Pencil

You need to know:

1. Subtraction is used everyday in many ways. Whenever you buy an item at the store, your change can be calculated by subtraction. On the job, you may subtract an oil reading from total usage, subtract the lowest bag weight from the highest bag weight to calculate bag weight range, or subtract minor ingredients to put the proper amount of ingredients into the mixer.

2. Subtraction is the opposite of addition. Addition is combining two or more quantities while subtraction is the process of taking one number away from another. It is the process of determining the difference between two numbers or quantities.

3. Use subtraction to figure out how much is left when you remove one number from another or when you want to compare two numbers.

EXAMPLE: (A) Betty had \$7.00. She gave \$3.50 to Ted for his lunch. How much money did Betty have left?

(A) \$ 7.00
- 3.50
Answer \$ 3.50

Activity 6 - Subtraction of Whole Numbers (continued)

You need to know: (continued)

EXAMPLE: (B) If a large bag of cookies weighs 18 ounces and a small bag weighs 10 ounces, how much more does the large bag weigh?

$$\begin{array}{rrl} & 18 & \text{ounces} \\ - & \underline{10} & \text{ounces} \\ \text{Answer} & 8 & \text{ounces} \end{array}$$

4. The number from which another number is to be subtracted is called the minuend. The number to be subtracted is the subtrahend. The result (answer) is called the difference or remainder.

EXAMPLE:

$$\begin{array}{rrl} & 246 & \text{minuend} \\ - & \underline{134} & \text{subtrahend} \\ \text{Answer} & 112 & \text{difference (remainder)} \end{array}$$

Activity 6 - Subtraction of Whole Numbers (continued)

You need to know: (continued)

5. To subtract whole numbers:

EXAMPLE: Subtract 231 from 744.

(A) Write the larger number as the minuend.

(B) Place the digits in the subtrahend in proper columns.

(C) Begin with the units (ones) column and take 1 away from 4. Record the difference (3) in the units column.

(D) Continue in the same manner with the tens and hundreds columns (subtract other columns to the left, where applicable).

(E) The answer (513) is the difference between the two numbers.

	Hundreds	Tens	Ones
Minuend →	7	4	4
Subtrahend →	2	3	1
	5	1	3

Activity 6 - Subtraction of Whole Numbers (continued)

You need to know:

6. If a digit in the subtrahend is too large to take from the digit above it in the minuend, borrow from the next column in the minuend in order to subtract.

   (A) Since you can't subtract 6 from 2, borrow 1 ten from the tens column. (10 + 2 = 12). Place a small 1 next to the 2 in the minuend to show that it is now 12.

   EXAMPLE:

$$\begin{array}{r} \overset{6}{\cancel{7}}\;{}^{1}2 \\ -\,2\quad 6 \\ \hline 4\quad 6 \end{array}$$

   (B) Cross out the 7 in the tens column and make it a six to show that your borrowed 1 ten.

   (C) Subtract: 12 - 6 = 6

   (D) Subtract: 6 - 2 = 4

   (E) The answer (46) is the difference between the two numbers.

Activity 6 - Subtraction of Whole Numbers (continued)

You need to know:

7. If you have to borrow more than once in the same problem, continue the same process with remaining columns. Proceed to subtract by borrowing until you have subtracted each digit

EXAMPLE:

$$\begin{array}{rrrr} & \overset{7}{\cancel{8}} & \overset{15}{\cancel{6}} & \overset{1}{4} \\ - & & 8 & 7 \\ \hline & 7 & 7 & 7 \end{array}$$

8. To check a subtraction problem, add the difference (answer) to the subtrahend of the original problem. The sum should be the minuend of the original problem.

EXAMPLE:

$$\begin{array}{rr} & 39 \\ - & 14 \\ \hline & 25 \end{array}$$

(1) 9 - 4 = 5
(2) 3 - 1 = 2

CHECK

$$\begin{array}{rr} & 39 ✓ \\ - & 14 \\ \hline & 25 \\ \hline & 39 ✓ \end{array}$$

(1) 4 + 5 = 9
(2) 1 + 2 = 3

9. For every subtraction problem, there is an equivalent addition problem.

EXAMPLE: 16 - 7 = 9 because 9 + 7 = 16

Activity 6 - Subtraction of Whole Numbers (continued)

Directions: Practice subtracting in your head a one digit number from a larger number. Have a classmate time you for exactly 5 minutes as you work to accurately complete the chart. Subtract the numbers in the left column from each of the numbers across the top of the chart. GO AS FAST AS YOU CAN!

—	16	23	30	18	90	12	47	10	25
9									
7									
5									
3									
8									
6									
4									

Activity 6 - Subtracting Whole Numbers

(1) Directions: Subtract.

1.	8	7	4	9	8	3	1	8	5	6
	- 4	- 0	- 2	- 0	- 7	- 2	- 1	- 5	- 2	- 6

2.	6	5	7	4	9	8	2	6	7	9
	- 3	- 4	- 7	- 3	- 2	- 5	- 0	- 2	- 6	- 6

3.	4	8	13	9	6	12	3	15	11	4
	- 0	- 2	- 8	- 1	- 6	- 3	- 1	- 7	- 5	- 1

Activity 6 - Subtracting Whole Numbers

(2) Directions: Subtract.

1.	10	5	18	8	6	15	9	16	5	12
—	- 5	- 1	- 9	- 2	- 6	- 7	- 7	- 9	- 5	- 4

2.	5	7	8	13	11	7	8	11	10	9
	- 3	- 6	- 3	- 5	- 3	- 2	- 0	- 9	- 7	- 9

3.	13	12	11	2	7	13	6	6	9	13
	- 8	- 3	- 5	- 2	- 0	- 9	- 5	- 1	- 0	- 6

Activity 6 - Subtracting Whole Numbers

(3) Directions: Subtract.

1.	16	8	10	5	6	5	7	14	18	11
—	- 7	- 6	- 5	- 4	- 2	- 1	- 3	- 8	- 9	- 4

2.	12	10	12	14	7	10	16	5	7	11
	- 5	- 3	- 8	- 9	- 5	- 4	- 7	- 4	- 3	- 4

3.	7	5	13	14	3	4	15	10	9	2
	- 1	- 2	- 7	- 6	- 2	- 3	- 6	- 9	- 3	- 1

Activity 6 - Subtracting Whole Numbers

(4) Directions: Subtract.

1.	13	4	9	5	8	3	1	8	11	12
—	- 7	- 3	- 3	- 0	- 5	- 3	- 1	- 7	- 6	- 7

2.	9	12	10	7	11	11	7	14	15	2
	- 8	- 9	- 8	- 6	- 3	- 9	- 1	- 6	- 6	- 1

3.	10	14	12	6	7	11	9	10	1	8
	- 1	- 9	- 6	- 0	- 5	- 7	- 5	- 4	- 0	- 1

Activity 6 - Subtracting Whole Numbers

(5) Directions: Subtract.

1.	14	11	2	17	16	4	5	13	8	9
	- 7	- 2	- 0	- 9	- 8	- 2	- 3	- 5	- 0	- 9

2.	6	5	10	13	8	17	7	3	15	11
	- 4	- 0	- 2	- 4	- 5	- 8	- 4	- 3	- 9	- 8

3.	6	15	4	3	9	7	10	6	9	8
	- 3	- 8	- 4	- 0	- 4	- 7	- 1	- 0	- 5	- 1

Activity 6 - Subtracting Whole Numbers

(6) Directions: Subtract.

1.	1	14	6	8	9	15	11	10	4	12
—	- 1	- 5	- 3	- 7	- 6	- 8	- 6	- 6	- 4	- 7

2.	12	11	1	8	6	14	4	9	3	4
	- 6	- 7	- 0	- 6	- 2	- 8	- 0	- 1	- 1	- 1

3.	8	7	10	5	3	10	6	13	7	11
	- 3	- 2	- 7	- 2	- 2	- 9	- 4	- 4	- 4	- 8

Activity 6 - Subtracting Whole Numbers

(7) Directions: Subtract.

1.	6	17	9	6	16	12	9	4	10	13
—	- 5	- 9	- 8	- 1	- 8	- 9	- 0	- 2	- 8	- 6

2.	10	17	15	14	9	10	9	8	13	8
	- 2	- 8	- 9	- 5	- 6	- 6	- 2	- 8	- 6	- 4

3.	9	2	14	16	7	11	5	13	2	12
	- 7	- 2	- 7	- 9	- 0	- 2	- 5	- 9	- 0	- 4

Activity 6 - Subtracting Whole Numbers

(8) Directions: Subtract and check.

1.	60	35	77	74	58
	- 40	- 21	- 73	- 40	- 32

2.	63	72	85	96	43
	- 22	- 70	- 34	- 62	- 43

3.	91	62	33	52	45
	- 6	- 9	- 4	- 27	- 16

Activity 6 - Subtracting Whole Numbers

(9) Directions: Subtract and check.

1.	57	43	65	82	60
	- 18	- 25	- 8	- 75	- 42
2.	36	48	51	25	74
	- 18	- 29	- 36	- 18	- 27
3.	34	69	38	52	75
	- 22	- 35	- 31	- 32	- 51

Activity 6 - Subtracting Whole Numbers

(10) Directions: Subtract and check.

1.	82 - 9	27 - 8	21 - 7	95 - 8	63 - 5
2.	54 - 33	28 - 14	94 - 51	77 - 36	58 - 48
3.	83 - 25	95 - 39	50 - 28	68 - 49	97 - 58

Activity 6 - Subtracting Whole Numbers

(11) Directions: Subtract and check.

1.	$\begin{array}{r}78\\-15\\\hline\end{array}$	$\begin{array}{r}28\\-10\\\hline\end{array}$	$\begin{array}{r}56\\-12\\\hline\end{array}$	$\begin{array}{r}67\\-25\\\hline\end{array}$	$\begin{array}{r}79\\-54\\\hline\end{array}$
2.	$\begin{array}{r}67\\-8\\\hline\end{array}$	$\begin{array}{r}95\\-9\\\hline\end{array}$	$\begin{array}{r}48\\-9\\\hline\end{array}$	$\begin{array}{r}68\\-9\\\hline\end{array}$	$\begin{array}{r}84\\-7\\\hline\end{array}$
3.	$\begin{array}{r}76\\-7\\\hline\end{array}$	$\begin{array}{r}47\\-8\\\hline\end{array}$	$\begin{array}{r}94\\-8\\\hline\end{array}$	$\begin{array}{r}81\\-40\\\hline\end{array}$	$\begin{array}{r}62\\-11\\\hline\end{array}$

Activity 6 - Subtracting Whole Numbers

(12) Directions: Subtract and check.

1.	85	44	68	70	42
	- 16	- 27	- 59	- 32	- 18
2.	76	21	65	87	48
	- 71	- 11	- 53	- 62	- 17
3.	53	28	97	79	64
	- 36	- 19	- 28	- 58	- 26

Activity 6 - Subtracting Whole Numbers

(13) Directions: Subtract and check.

1.

$$\begin{array}{r} 75 \\ -\underline{17} \end{array} \qquad \begin{array}{r} 71 \\ -\underline{26} \end{array} \qquad \begin{array}{r} 38 \\ -\underline{19} \end{array} \qquad \begin{array}{r} 24 \\ -\underline{11} \end{array} \qquad \begin{array}{r} 92 \\ -\underline{39} \end{array}$$

2.

$$\begin{array}{r} 57 \\ -\underline{29} \end{array} \qquad \begin{array}{r} 61 \\ -\underline{34} \end{array} \qquad \begin{array}{r} 92 \\ -\underline{83} \end{array} \qquad \begin{array}{r} 41 \\ -\underline{21} \end{array} \qquad \begin{array}{r} 37 \\ -\underline{15} \end{array}$$

3.

$$\begin{array}{r} 62 \\ -\underline{21} \end{array} \qquad \begin{array}{r} 46 \\ -\underline{25} \end{array} \qquad \begin{array}{r} 58 \\ -\underline{26} \end{array} \qquad \begin{array}{r} 61 \\ -\underline{47} \end{array} \qquad \begin{array}{r} 92 \\ -\underline{29} \end{array}$$

Activity 6 - Subtracting Whole Numbers

(14) Directions: Subtract and check.

1.	300	400	600	200	900
	- 37	- 45	- 63	- 34	- 51
2.	553	417	864	241	752
	- 69	- 58	- 87	- 48	- 57
3..	251	742	927	381	793
	- 38	- 27	- 18	- 53	- 86

Activity 6 - Subtracting Whole Numbers

(15) Directions: Subtract and check.

1.	896	692	546	695	588
	- 88	- 85	- 37	- 88	- 79
2.	205	306	402	508	206
	- 86	- 38	- 46	- 59	- 49
3.	795	932	866	357	614
	- 29	- 38	- 47	- 28	- 17

Activity 6 - Subtracting Whole Numbers

(16) Directions: Subtract and check.

1.	602	501	803	902	401
	- 58	- 29	- 37	- 44	- 53
2.	968	141	572	543	519
	- 74	- 80	- 91	- 62	- 53
3.	640	365	482	981	288
	- 27	- 48	- 75	- 63	- 59

Cluster
Applied Math

Activity 6 - Subtracting Whole Numbers

(17) Directions: Subtract and check.

1. $\begin{array}{r} 334 \\ -\ 299 \\ \hline \end{array}$ $\begin{array}{r} 634 \\ -\ 467 \\ \hline \end{array}$ $\begin{array}{r} 310 \\ -\ 123 \\ \hline \end{array}$

2. $\begin{array}{r} 246 \\ -\ 134 \\ \hline \end{array}$ $\begin{array}{r} 983 \\ -\ 672 \\ \hline \end{array}$ $\begin{array}{r} 643 \\ -\ 482 \\ \hline \end{array}$

3. $\begin{array}{r} 401 \\ -\ 389 \\ \hline \end{array}$ $\begin{array}{r} 893 \\ -\ 748 \\ \hline \end{array}$ $\begin{array}{r} 472 \\ -\ 472 \\ \hline \end{array}$

Activity 6 - Subtracting Whole Numbers

(18) Directions: Subtract and check.

1.

$$\begin{array}{rrr} 641 & \qquad 812 & \qquad 559 \\ -\ \underline{500} & \qquad -\ \underline{602} & \qquad -\ \underline{247} \end{array}$$

2.

$$\begin{array}{rrr} 885 & \qquad 740 & \qquad 482 \\ -\ \underline{452} & \qquad -\ \underline{520} & \qquad -\ \underline{331} \end{array}$$

3.

$$\begin{array}{rrr} 562 & \qquad 496 & \qquad 842 \\ -\ \underline{491} & \qquad -\ \underline{263} & \qquad -\ \underline{761} \end{array}$$

Activity 6 - Subtracting Whole Numbers

(19) Directions: Subtract and check.

1.	525	287	216
	- 247	- 198	- 158
2.	305	207	401
	- 278	- 199	- 285
3.	466	373	983
	- 388	- 199	- 585

Activity 6 - Subtracting Whole Numbers

(20) Directions: Subtract and check.

1. $\begin{array}{r} 502 \\ -\ \underline{263} \end{array} \qquad \begin{array}{r} 308 \\ -\ \underline{149} \end{array} \qquad \begin{array}{r} 604 \\ -\ \underline{326} \end{array}$

2. $\begin{array}{r} 418 \\ -\ \underline{279} \end{array} \qquad \begin{array}{r} 957 \\ -\ \underline{821} \end{array} \qquad \begin{array}{r} 627 \\ -\ \underline{468} \end{array}$

3. $\begin{array}{r} 650 \\ -\ \underline{440} \end{array} \qquad \begin{array}{r} 848 \\ -\ \underline{232} \end{array} \qquad \begin{array}{r} 567 \\ -\ \underline{356} \end{array}$

Activity 6 - Subtracting Whole Numbers

(21) Directions: Subtract and check.

1. $\begin{array}{r} 467 \\ -\ 349 \\ \hline \end{array}$ $\quad$ $\begin{array}{r} 355 \\ -\ 237 \\ \hline \end{array}$ $\quad$ $\begin{array}{r} 653 \\ -\ 409 \\ \hline \end{array}$

2. $\begin{array}{r} 983 \\ -\ 147 \\ \hline \end{array}$ $\quad$ $\begin{array}{r} 578 \\ -\ 429 \\ \hline \end{array}$ $\quad$ $\begin{array}{r} 356 \\ -\ 180 \\ \hline \end{array}$

3. $\begin{array}{r} 942 \\ -\ 611 \\ \hline \end{array}$ $\quad$ $\begin{array}{r} 889 \\ -\ 278 \\ \hline \end{array}$ $\quad$ $\begin{array}{r} 468 \\ -\ 432 \\ \hline \end{array}$

Activity 6 - Subtracting Whole Numbers

(22) Directions: Subtract and check.

1. $\begin{array}{r} 893 \\ -\underline{\ 655\ } \end{array}$ $\qquad \begin{array}{r} 972 \\ -\underline{\ 408\ } \end{array}$ $\qquad \begin{array}{r} 331 \\ -\underline{\ 125\ } \end{array}$

2. $\begin{array}{r} 362 \\ -\underline{\ 188\ } \end{array}$ $\qquad \begin{array}{r} 721 \\ -\underline{\ 356\ } \end{array}$ $\qquad \begin{array}{r} 982 \\ -\underline{\ 581\ } \end{array}$

3. $\begin{array}{r} 371 \\ -\underline{\ 269\ } \end{array}$ $\qquad \begin{array}{r} 684 \\ -\underline{\ 547\ } \end{array}$ $\qquad \begin{array}{r} 143 \\ -\underline{\ 128\ } \end{array}$

Activity 6 - Subtracting Whole Numbers

(23) Directions: Subtract and check.

1. $\begin{array}{r} 974 \\ -\ 923 \\ \hline \end{array}$ $\qquad$ $\begin{array}{r} 567 \\ -\ 524 \\ \hline \end{array}$ $\qquad$ $\begin{array}{r} 534 \\ -\ 311 \\ \hline \end{array}$

2. $\begin{array}{r} 337 \\ -\ 155 \\ \hline \end{array}$ $\qquad$ $\begin{array}{r} 812 \\ -\ 90 \\ \hline \end{array}$ $\qquad$ $\begin{array}{r} 764 \\ -\ 581 \\ \hline \end{array}$

3. $\begin{array}{r} 952 \\ -\ 940 \\ \hline \end{array}$ $\qquad$ $\begin{array}{r} 540 \\ -\ 230 \\ \hline \end{array}$ $\qquad$ $\begin{array}{r} 686 \\ -\ 251 \\ \hline \end{array}$

Activity 6 - Subtracting Whole Numbers

(24) Directions: Subtract and check.

1.	794 - 478	652 - 239	498 - 379
2.	563 - 185	777 - 298	835 - 348
3.	364 - 263	751 - 401	523 - 321

Activity 6 - Subtracting Whole Numbers

(25) Directions: Subtract and check.

1. $\begin{array}{r} 458 \\ -\ 349 \\ \hline \end{array}$ $\quad\begin{array}{r} 691 \\ -\ 227 \\ \hline \end{array}$ $\quad\begin{array}{r} 854 \\ -\ 536 \\ \hline \end{array}$

2. $\begin{array}{r} 278 \\ -\ 119 \\ \hline \end{array}$ $\quad\begin{array}{r} 445 \\ -\ 108 \\ \hline \end{array}$ $\quad\begin{array}{r} 764 \\ -\ 545 \\ \hline \end{array}$

3. $\begin{array}{r} 249 \\ -\ 134 \\ \hline \end{array}$ $\quad\begin{array}{r} 553 \\ -\ 243 \\ \hline \end{array}$ $\quad\begin{array}{r} 916 \\ -\ 503 \\ \hline \end{array}$

Activity 6 - Subtracting Whole Numbers

(26) Directions: Subtract and check.

1.

$$\begin{array}{r} 683 \\ -\ 421 \\ \hline \end{array} \qquad \begin{array}{r} 944 \\ -\ 703 \\ \hline \end{array} \qquad \begin{array}{r} 871 \\ -\ 260 \\ \hline \end{array}$$

2.

$$\begin{array}{r} 772 \\ -\ 341 \\ \hline \end{array} \qquad \begin{array}{r} 908 \\ -\ 305 \\ \hline \end{array} \qquad \begin{array}{r} 197 \\ -\ 122 \\ \hline \end{array}$$

3.

$$\begin{array}{r} 887 \\ -\ 352 \\ \hline \end{array} \qquad \begin{array}{r} 543 \\ -\ 243 \\ \hline \end{array} \qquad \begin{array}{r} 781 \\ -\ 300 \\ \hline \end{array}$$

Activity 6 - Subtracting Whole Numbers

(27) Directions: Subtract and check.

1. $\begin{array}{r} 692 \\ -\ 491 \\ \hline \end{array}$ $\qquad$ $\begin{array}{r} 485 \\ -\ 324 \\ \hline \end{array}$ $\qquad$ $\begin{array}{r} 727 \\ -\ 512 \\ \hline \end{array}$

2. $\begin{array}{r} 739 \\ -\ 628 \\ \hline \end{array}$ $\qquad$ $\begin{array}{r} 609 \\ -\ 203 \\ \hline \end{array}$ $\qquad$ $\begin{array}{r} 957 \\ -\ 342 \\ \hline \end{array}$

3. $\begin{array}{r} 266 \\ -\ 118 \\ \hline \end{array}$ $\qquad$ $\begin{array}{r} 385 \\ -\ 156 \\ \hline \end{array}$ $\qquad$ $\begin{array}{r} 597 \\ -\ 408 \\ \hline \end{array}$

Activity 6 - Subtracting Whole Numbers

(28) Directions: Subtract and check.

1.

$$\begin{array}{r} 800 \\ -\underline{\;263\;} \end{array} \qquad \begin{array}{r} 300 \\ -\underline{\;127\;} \end{array} \qquad \begin{array}{r} 500 \\ -\underline{\;233\;} \end{array}$$

2.

$$\begin{array}{r} 400 \\ -\underline{\;291\;} \end{array} \qquad \begin{array}{r} 600 \\ -\underline{\;382\;} \end{array} \qquad \begin{array}{r} 200 \\ -\underline{\;194\;} \end{array}$$

3.

$$\begin{array}{r} 700 \\ -\underline{\;266\;} \end{array} \qquad \begin{array}{r} 900 \\ -\underline{\;724\;} \end{array} \qquad \begin{array}{r} 300 \\ -\underline{\;123\;} \end{array}$$

Activity 6 - Subtracting Whole Numbers

(29) Directions: Subtract and check.

1.
5,037
- 329

1,201
- 642

5,834
- 855

2.
3,633
- 794

4,125
- 636

2,961
- 972

3.
1,896
- 484

1,896
- 494

1,896
- 498

Activity 6 - Subtracting Whole Numbers

(30) Directions: Subtract and check.

1.	1,876 - 689	3,243 - 892	3,243 - 856
2.	5,648 - 649	6,345 - 258	1,827 - 918
3.	8,002 - 628	9,003 - 324	4,005 - 556

Activity 6 - Subtracting Whole Numbers

(31) Directions: Subtract and check.

1. 4,080   3,070   5,020
 - 387   - 991   - 438

2. 1,896   1,004   4,468
 - 499   - 687   - 579

3. 3,006   8,007   1,006
 - 439   - 299   - 307

Activity 6 - Subtracting Whole Numbers

(32) Directions: Subtract and check.

1.	2,040 - 462	3,060 - 392	1,050 - 465
2.	4,003 - 621	9,002 - 972	6,001 - 430
3.	7,263 - 185	4,775 - 683	5,176 - 438

Activity 6 - Subtracting Whole Numbers

(33) Directions: Subtract and check.

1.	8,240 - 327	2,334 - 516	1,615 - 807
2.	3,004 - 973	5,006 - 425	2,007 - 347

Activity 7 - Calculating the Range of Whole Numbers

Objective(s): This activity will enable participants to find the range between two numbers.

Materials Required:
Pencil
Scratch Paper

You need to know:

1. Subtraction is used to calculate the range between two numbers.

2. The range is the difference between the lowest number and the highes number calculated when taking measurements such as temperatures, weights, etc.

EXAMPLE:
Find the range of these dough weights:
106 g 101 g 110 g 103 g

A. Arrange the measurements (temperatures, weights, etc.) in sequence:

110 g
106 g
103 g
101 g

B. Determine the largest measurement. → 110 g

C. Determine the smallest measurement. → 101 g

Activity 7 - Calculating the Range of Whole Numbers (continued)

You need to know:

D. Subtract the smallest measurement from the largest measurement.

$$\begin{array}{r} 110 \text{ g} \\ -\ \underline{101} \text{ g} \\ 9 \text{ g} \end{array} \quad \text{(range)}$$

E. The difference is the range.

3. The simplest way to report variations is to give the range between the highest and lowest measurement. You can interpret the variation in a process by examining the patterns on control charts. Such patterns let you know if the process is operating according to guidelines or if it is not in control.

4. For example, you can check wet weights, dough weights, or oven temperatures by calculating the range between measurements.

Activity 7 - Calculating the Range of Whole Numbers (continued)

Directions: Underline the largest and the smallest number in each row belo
Calculate the range of each row of numbers and write your answer in the blank.

					Range
A)	18	12	14	16	________
B)	21	27	23	25	________
C)	6	2	8	4	________
D)	9	7	5	3	________
E)	44	48	42	40	________
F)	33	35	32	36	________
G)	51	50	53	57	________
H)	17	11	6	3	________
I)	33	13	22	11	________
J)	213	266	245	202	________

Activity 7 - Calculating the Range of Whole Numbers (continued)

Directions: Calculate the range.

1. Find the range of the following oil readings:

4 % 11 % 10 % 8 % 13 %

Range: %

2. Find the range of the following bag weights:

18 oz. 17 oz. 14 oz. 12 oz. 10 oz.

Range: oz.

3. Calculate the range of the following wet weights:

A) 74 69 67 Range:

B) 76 72 67 Range:

C) 69 72 68 Range:

D) 70 74 66 Range:

E) 76 75 65 Range:

4. Find the range of these oven temperatures:

A) 410° 580° 550° 520° 415° 330° 420° 450°

Range: °

B) 350° 500° 510° 400° 340° 360° 300° 320°

Range: °

Activity 8 - Calculating Tare Weights

Objective(s): This activity will enable participants to determine product weights.

Materials Required:
Pencil
Scratch Paper

You need to know:

1. To figure out precisely how much product or ingredient is on a scale, you must first subtract the weight of the packaging material or container holding the product or ingredient. This packaging material or container is known as the tare.

2. If a bag of Oreos® is labeled 20 ounces, this means 20 ounces of edible product, not including the bag (tare weight). To determine how much edible product is in the bag, first weigh the empty bag and then subtract this weight from the weight of the full bag. The remainder (difference) is the actual amount of edible product inside the bag. When you press the Tare Key on the scale, the scale makes this calculation for you.

EXAMPLE: Find the following product weight:

	16 oz.	of cookies including the bag
-	2 oz.	of packaging material (tare)
	14 oz.	exact weight of cookies inside the bag

Activity 9 - Subtracting Whole Numbers (Word Problems)

Directions: Use subtraction to solve the following problems:

1. Suppose lines 8 and 9 in a bakery produce Snackwells®. The total number of units produced daily is 32,988. Line 9 produces 18,752 units per day. How many units are produced by Line 8?

   ____

2. The total package weight of a box of Cheese Nips® is 383 grams. The tare weight is 73 grams. What is the net weight?

   ____

3. The total package weight of a package of Chips Ahoy!® is 18 ounces. The packaging tare is 2 ounces. What is the net weight?

   ____

4. The total package weight of a box of Premium® crackers is 17 ounces. The tare weight is 1 ounce. What is the actual product weight?

   ____

5. One Thursday, shift 2 produced 634 doughs and shift 3 produced 527 doughs. How many more doughs did shift 2 produce than shift 3?

   ____

6. On Wednesday, shift 1 produced 694 pounds of B&R and shift 2 produced 447 pounds of B&R. How much more B&R was produced by shift 1 than by shift 2?

   ____

Activity 9 - Subtracting Whole Numbers (Word Problems) (continued)

7. On Friday, three shifts produced Oreos®. Shift 3 produced 9,298 units, shift 1 produced 9,986 units, and shift 2 produced 8,897 units.

   A) How many more units did shift 1 produce than shift 3?

   ____

   B) How many more units did shift 1 produce than shift 2?

   ____

   C) How many more units did shift 3 produce than shift 2?

   ____

8. Find the following product weights:

   A) 178g of product; 10g of packaging material

   product weight: _________

   B) 249g of product; 13g of packaging material

   product weight: _________

   C) 254g of product; 12g of packaging material

   product weight: _________

   D) 12 oz. of product; 2 oz. of packaging material

   product weight: _________

   E) 22 oz. of product; 4 oz. of packaging material

   product weight: _________

Activity 10 - Decimal Place Values/Reading and Writing Decimals

Objective(s): This activity will enable participants to identify decimal place values and to read and write decimals.

Materials Required:
Pencil

You need to know:

1. A decimal is a number which stands for a part of a whole. It is written with a decimal point (.) followed by digits to the right. Each digit to the right of the decimal point stands for less than a whole number.

2. Like whole numbers, the placement of each digit in a decimal number, or its place value, determines the value of the decimal.

3. The decimal point (.) separates the whole number places from the decimal places. Moving to the left of the decimal point, place values increase. Moving to the right of the decimal point, place values decrease.

4. Decimals may be read in two different ways:
   (a) Place Value - Read the value of the entire number and read the decimal point as "and." Use the place value of the last digit in reading the decimal. For example, .4 is read "four tenths"; .04 is read "four hundredths"; .004 is read "four thousandths"; .0004 is read "four ten-thousandths"; and 1.45 is read "one and forty five hundredths".

Activity 10 - Decimal Place Values/Reading and Writing Decimals (continued)

You need to know:

Hundreds	Tens	Ones	Decimal Point	Tenths	Hundredths	Thousandths	Ten Thousandths	Hundred Thousandths	Millionths
			.	4					
			.	0	4				
			.	0	0	4			
			.	0	0	0	4		
		1	.	4	5				

(b) Point Value - Read each digit, reading the decimal point as "point." For example, 1.45 is read "one point four five."

EXAMPLES:

.9 = nine tenths, or point nine

.015 = fifteen thousandths, or point zero one five

12.43 = twelve and forty-three hundredths, or twelve point four three

118.257 = one hundred eighteen and two hundred fifty-seven thousandths, or one hundred eighteen point two five seven

Activity 10 - Decimal Place Values/Reading and Writing Decimals (continued)

Directions: Before starting this exercise, read aloud to the instructor the decimals listed below. Write the place name of the last digit in each decimal in the blank provided. Underline all the digits that represent less than a whole.

(1) 29.3 ____________________

(2) 679.23 ____________________

(3) 51.084 ____________________

(4) 392.19 ____________________

(5) 500.453 ____________________

(6) 14.7 ____________________

(7) 38.22 ____________________

(8) 142.002 ____________________

(9) 25.6341 ____________________

(10) 12.36 ____________________

Activity 10 - Decimal Place Values/Reading and Writing Decimals (continued)

Directions: Rewrite the numbers below as decimals. When you've completed the exercise, read the decimals aloud to the instructor.

(1) twenty-seven and eight tenths __________

(2) forty-five and sixty-three hundredths __________

(3) nineteen and two hundred forty-two thousandths __________

(4) twenty-five and thirty-four ten thousandths __________

(5) fifty and thirty-three thousandths __________

(6) eighty-one hundredths __________

(7) three and five tenths __________

(8) one hundred thirty-seven thousandths __________

(9) twelve and fifteen thousand six hundred twenty-five hundred-thousandths __________

(10) eight hundred seventy-five ten-thousandths __________

Activity 10 - Decimal Place Values/Reading and Writing Decimals

Directions: Write the following decimals in words.

(1) .8 ______________________________

(2) .09 ______________________________

(3) .378 ______________________________

(4) 10.475 ______________________________

(5) .0028 ______________________________

(6) 8.000326 ______________________________

(7) 19.55 ______________________________

(8) .0041 ______________________________

(9) .000208 ______________________________

(10) 16.013 ______________________________

Activity 11 - Adding Decimals

Objective(s): This activity will enable participants to add decimals.

Materials Required:
Pencil
Scratch Paper

You need to know:

1. A decimal is a number which stands for a part of a whole. It is written with a decimal point (.) followed by digits to the right. Each digit to the right of the decimal point stands for less than a whole number. The decimal point is also used to separate whole numbers from decimals.

2. Decimals are special types of fractions which are used daily. They are often referred to as decimal fractions.
   A) Any fraction with a denominator of 10 or a multiple of 10 can be written as a decimal.

      EXAMPLES:

$$\frac{3}{10} = .3, \quad \frac{175}{1000} = .175, \quad \frac{15}{100} = .15$$

   B) Decimal fractions are used every day.

      EXAMPLES:

money system (dollars and cents)	$ 5.95
gallons of gasoline	12.8 gallons
timing of sports events	9.5 seconds
car mileage	7.2 miles

Activity 11 - Adding Decimals (continued)

You need to know:

3. Decimal measurements are used in recording net weights, product moisture, slug weights, product pH, etc. Suppose you were asked to find the total slug weight of six Premium® slugs. Since cracker slugs may be measured in decimal form, you would need to know how to add decimals.

4. Adding decimals is very similar to adding whole numbers. In fact, the only difference between adding whole numbers and adding decimals is the placement of the decimal point.

EXAMPLE: Add .2 + 6.07 + 1.943 + .005

A) Write the numbers under each other so that all the decimal points are aligned vertically.

$$\begin{array}{l} .2 \\ 6.07 \\ 1.943 \\ \underline{.005} \end{array}$$

Zeros may be added to the numbers so that they all have an equal number of places after the decimal point. Adding zeros will not change the value of the numbers. Besides, you may follow this practice to avoid errors in addition.

$$\begin{array}{l} .2000 \\ 6.0700 \\ 1.9430 \\ \underline{.0050} \end{array}$$

Activity 11 - Adding Decimals (continued)

You need to know:

B) Add each column with the same place value, starting with the column farthest to the right.

If a sum is greater than 9, carry to the column immediately to the left.

```
  .2000
 6.0700
 1.9430
  .0050
 ------
  82180
```

C) Write the decimal point in the answer so that it lines up with the decimal points in the problem.

```
  .2000
 6.0700
 1.9430
  .0050
 ------
 8.2180  Answer
```

Activity 11 - Adding Decimals (continued)

Directions: Add.

1.	.6	.3	.9	.1
	.5	.2	.7	.4
	.1	.4	.8	.7
2.	.2	.3	.4	.5
	.4	.5	.6	.7
	.6	.7	.8	.9
3.	.10	.12	.19	.13
	.15	.14	.17	.16
	.20	.16	.14	.18
4.	.11	.15	.22	.19
	.32	.28	.73	.37
	.54	.45	.47	.51

Activity 11 - Adding Decimals (continued)

Directions: Add.

1.	.4	.9	.1	.8
	.7	.5	.6	.4
	8.7	4.3	3.2	6.5
2.	9.3	2.3	4.8	7.6
	17.7	18.6	16.4	15.2
	74.2	62.7	88.5	53.9
3.	76.8	32.5	67.9	35.7
	119.42	321.26	392.28	231.09
	24.4	29.3	21.8	10.6
4.	3.8	5.7	4.5	3.2
	2.1	3.2	1.3	2.5

Activity 11 - Adding Decimals (continued)

Directions: Add.

1.	9.3 1.4	2.6 5.3	2.9 8.4	8.3 9.9
2.	3.02 8.3	7.29 5.0	6.55 4.3	4.69 6.4
3.	.41 2.89	.57 4.18	.23 7.08	.64 3.77
4.	.32 9.46	.13 2.06	.47 5.32	.16 4.82

Activity 11 - Adding Decimals (continued)

Directions: Add.

1.	6.6 .81 .056	2.1 .49 .043	8.9 .67 .039	9.2 .10 .500
2.	60.3 2.85 5.77	.870 1.54 725.073	194.7 84.02 9.006	6.57 29.35 1.7
3.	14.6 .73 7.18	24.3 .10 25.67	8.80 7.7 52.3	.223 20.9 57.46
4.	.817 6.465 3.73	62.1 8.97 .973	.526 6.83 3.4	62.1 8.97 .9730

Activity 11 - Adding Decimals (continued)

Directions: Calculate the following sums.

1. 5,342.1 + 367.22 = ______________

2. 29 + 32.43 + 236.211 + 10.32 = ____________

3. Following are net weights for 18-ounce packages of Chips Ahoy!® What is the total net weight for these six packages?

   Answer: ________________ounces

   17.9 18.2 18.4 18.7 18.5 18.8

4. Following are the net weights for 13.5-ounce boxes of Cheese Nips®. What is the total net weight for these 4 boxes?

   Answer: _____________ounces

   13.383 13.501 13.496 13.023

5. Following are the slug weights for six Chips Ahoy!® slugs. What is the total weight of the slugs?

   Answer: _____________grams

   255.3 249.1 254.6 264.4 257.8 261.7

Activity 12 - Rounding Decimals

Objective(s): This activity will enable participants to round decimals to the nearest tenth, hundredth, and thousandth place.

Materials Required:
Pencil

You need to know:

1. Decimals are often rounded off, especially when working with measurements. In fact, the steps for rounding off decimals are the same as those used for rounding off whole numbers.

2. HOW TO ROUND DECIMALS
   - A) Identify the digit just to the right of the place to which you are rounding.
   - B) If this digit is less than 5, drop it (and all the digits to its right, if applicable).
   - C) If the digit is 5 or more, add 1 to the digit in the place to which you are rounding.

3. EXAMPLE:

Suppose you were asked to round the net weight of a carton of Premiums® to the nearest tenth (16.65 ounces).

The digit just to the right of the place to which you are rounding is 5 (16.65 ounces).

If this digit is less than 5 (16.64 ounces), drop it (and all the digits to its right, if applicable).
16.6$\cancel{4}$ = 16.6 ounces (answer)

Since this digit is at least 5 (or more), add 1 to the digit in the place to which you are rounding.
16.65 ounces = 16.7 ounces (answer)

Activity 12 - Rounding Decimals

Directions: Round the numbers as indicated below.

1. Round the net weight of this product to he nearest tenth.

16.37 ounces ___________ounces

2. Round the product moisture to the nearest tenth and the nearest hundredth.

4.172% ___________%

___________%

3. Round the slug weight to the nearest tenth and the nearest one.

254.65 grams ___________grams

___________grams

4. Round the following number to the nearest ten thousandth, thousandth, and hundredth.

.01525 ___________

____

____

Activity 12 - Rounding Decimals

Directions: Round the following decimals to the nearest tenth:

1) 4.57 ____________________
2) 2.52 ____________________
3) 1.85 ____________________
4) 12.04 ____________________
5) .68 ____________________

Directions: Round the following decimals to the nearest hundredth:

6) 9.048 ____________________
7) 7.563 ____________________
8) 2.497 ____________________
9) 3.299 ____________________
10) .485 ____________________

Directions: Round the following decimals to the nearest thousandth.

11) 5.1836 ____________________
12) 7.4889 ____________________
13) 1.6378 ____________________
14) .2546 ____________________
15) .1168 ____________________

Activity 13 - Subtracting Decimals

Objective(s): This activity will enable participants to subtract decimals.

Materials Required:
Pencil
Scratch Paper

You need to know:

1. Write the larger number on top and line up the decimal points one under the other.

EXAMPLE

19.7 - .169

$$\begin{array}{r} 19.7 \\ \underline{.169} \end{array}$$

2. Add zeros to the right of the decimal point so that each decimal has the same number of places. The top number should have the same number of decimal places as the bottom.

$$\begin{array}{rrl} & 19.700 & \text{(minuend)} \\ - & \underline{.169} & \text{(subtrahend)} \end{array}$$

3. Subtract as you would for the whole numbers and bring down the decimal point in the difference. This decimal point should be aligned under the other decimal points.

$$\begin{array}{rrl} & 19.700 & \\ - & \underline{.169} & \\ & 19.531 & \text{(difference or answer)} \end{array}$$

Activity 13 - Subtracting Decimals

Directions: Find the differences in the problems below.

(1) 6.2 - 3.76 = ____________

(2) 45.92 - 23.07 = ____________

(3) 5 - 2.493 = ____________

(4) 382 - 46.20 = ____________

(5) 12 - .936 = ____________

(6) 835.091 - 482.320 = ____________

(7) 3.2 - .1986 = ____________

(8) 78 - 35.83 = ____________

(9) 29.34 - 16.52 = ____________

(10) .07 - .002 = ____________

(11) 1 - .047 = ____________

(12) .47 - .3992 = ____________

(13) 89.3 - .764 = ____________

(14) 963.857 - 241.534 = ____________

Activity 13 - Subtracting Decimals

Directions: Find the difference in the following problems.

1. 93.7 - 39.48 = ________________

2. 3,724.266 - 859.001 = ______________

3. Calculate the net weight of a box of Better Cheddars®:
   Total package weight (ounces): 9.86; Tare weight (ounces): 1.3

   Net weight: _____________________

4. Calculate the net weight of a box of Honey Maid Graham Crackers®:
   Total package weight (ounces): 17.6; Tare weight (ounces): 1.28

   Net weight: _____________________

5. Suppose the wet weight of a Premium® cracker sample is 89.8 grams. The dry weight is 86.45 grams. What is the difference between the wet and dry weights?

   ____

6. On Thursday, shift 1 produced 646.99 pounds of B&R and shift 2 produced 972.5 pounds. How much more B&R was produced by shift 2 than by shift 1?

   ____

7. The average number of Oreo® units produced per day on shift 1 is 4,000.58. The average number of Oreo® units produced per day on shift 2 is 3,895.6. On average, how many more units does shift 1 produce than shift 2?

   ____

Activity 14 - Comparing Decimals

Objective(s): This activity will enable participants to compare decimals.

Materials Required:
Pencil

You need to know: To compare decimals.....

1. Compare the digits to the left of the decimal point as whole numbers. If one whole number is larger, then that decimal is larger.

   EXAMPLE Compare: 427.36 with 425.263

   427 is larger than 425; therefore 427.36 is larger than 425.263.

2. When the whole numbers in decimals are equal, compare the first digit to the right of the decimal point. If one digit is larger, then that decimal is larger.

   You may give each decimal compared the same number of places by writing in zeros, if necessary. By using zeros as placeholders, you are giving each decimal a common denominator.

   EXAMPLE Compare: 18.331 with 18.47
   (18.331 with 18.470)

   The whole numbers are identical (18 and 18). Four (4) is larger than 3; therefore, 18.47 is larger than 18.331.

3. If the digits in the first place to the right of the decimal point (tenths) are the same, then compare the next place to the right (hundredths). If one digit is larger, then that decimal is larger.

   EXAMPLE Compare: 1.486 with 1.49
   (1.486 with 1.490)

   The whole numbers are identical (1 and 1). The digits in the first place to the right of the decimal point are the same (4 and 4). Nine (9) is larger than 8; therefore, 1.49 is larger than 1.486.

Activity 14 - Comparing Decimals

Directions: Write the larger decimal of each pair in the blank below.

(1) .502 .52 ____________

(2) .17 .21 ____________

(3) .6 .06 ____________

(4) .400 .500 ____________

(5) .30 .90 ____________

(6) .4 .45 ____________

(7) .57 .06 ____________

(8) .7 .2 ____________

(9) .14 .41 ____________

(10) .83 .8 ____________

Activity 15 - Calculating Range Using Decimals

Directions: Circle the largest and the smallest number in each row below. Calculate the range of each row of numbers and write your answer in the blank.

					Range
A)	17.8	17.08	17.1	17.11	______
B)	43	43.1	40	43.01	______
C)	234.9	234.19	233	234	______
D)	16.91	17.1	16.98	17.09	______
E)	23.16	22.93	23.61	23.094	______
F)	18.33	18.32	18.28	18.23	______
G)	51.98	51.	51.9	51.89	______
H)	46.7	46.71	46.75	46.78	______
I)	19.75	19.80	20.00	19.85	______
J)	34.99	34.9	35	35.72	______

Activity 15 - Calculating Range Using Decimals

Directions: Circle the largest and the smallest number in each row below. Calculate the range of each row of numbers and write your answer in the blank.

					Range
A)	16.8	16.08	15.1	15.11	__________
B)	16.3	16.1	15.8	15.9	__________
C)	19.85	20.00	19.75	20.71	__________
D)	243.7	243.17	242.00	243.00	__________
E)	41.0	41.3	40.0	41.6	__________
F)	6.8	7.2	6.9	7.6	__________
G)	1.6	1.2	.8	1.0	__________
H)	3.07	3.04	3.09	3.03	__________
I)	15.85	15.90	16.05	16.25	__________
J)	19.2	19.8	20.4	20.8	__________

Activity 16 - Multiplying Decimals

Objective(s): This activity will enable participants to multiply decimals.

Materials Required:
Pencil
Scratch Paper

You need to know: To multiply decimals, follow the steps below...

1. Line up the numbers one under the other for ease in multiplying. You may ignore the decimal places until you have found the product (number obtained by multiplying).
2. Multiply the decimals just as you would multiply whole numbers.
3. Count the number of decimal places in the numbers you have multiplied. Remember that whole numbers have 0 decimal places.
4. Starting from right to left, count off the same number of decimal places in the product. Place a decimal point in the product.

EXAMPLE

Suppose you are a packing technician employed by Nabisco and you want to compute your wages for a particular week. You earn $ 18.25 per hour and worked 39.75 hours. By multiplying the hourly rate by the number of hours worked, you can compute your pay for the week.

$ 18.25 **hourly rate**
x 39.75 **hours worked**

Activity 16 - Multiplying Decimals (continued)

You need to know:

$$\begin{array}{ccccccccl}
 & & & & 1 & 8. & 2 & 5 & \\
 & & & \times & 3 & 9. & 7 & 5 & \\
\cline{5-8}
 & & & & 9 & 1 & 2 & 5 & \\
 & & 1 & 2 & 7 & 7 & 5 & & \\
 & 1 & 6 & 4 & 2 & 5 & & & \text{partial products} \\
 & 5 & 4 & 7 & 5 & & & & \\
\cline{2-8}
\$ & 7 & 2 & 5 & 4 & 3 & 7 & 5 &
\end{array}$$

$$\begin{array}{lrl}
 & \$\,18.25 & \text{2 decimal places} \\
 & \times\ 39.75 & +\ \text{2 decimal places} \\
\cline{2-2}
\text{product} & \$\,725.4375 & \text{4 decimal places} \\
 & (\$\,725.44) &
\end{array}$$

5. To multiply decimals by 10, 100, or 1,000...
   a. count the number of zeros in 10, 100, or 1,000.
   b. move the decimal point to the right as many places as there are zeros in 10, 100, or 1,000.
   c. write in additional ending zeros, if necessary.
   d. remember that a whole number is understood to have a decimal point at its right.

Activity 16 - Multiplying Decimals

(1) Directions: Find the following products.

1. 1.14 x .8 = .912

2. .23 x .47 = .1081

3. 6.59 x .701 = 4.61959

4. Suppose you make $16.75 per hour. Last week you worked 39.5 hours. What will be your gross wages for the week?

   $ 661.625 ($ 661.63)

5. The net weight of a box of crackers is 13.5 ounces. Assuming that all boxes have the same net weights, how much will 12 boxes weigh?

   162 ounces

If you have less than 4 correct, see your instructor for additional help.

Activity 16 - Multiplying Decimals

(2) Directions: Multiply.

1. $\begin{array}{r} 34.7 \\ \times\ \ 8 \\ \hline \end{array}$ $\begin{array}{r} 2.89 \\ \times\ \ 7 \\ \hline \end{array}$ $\begin{array}{r} .551 \\ \times\ \ 6 \\ \hline \end{array}$ $\begin{array}{r} 60.3 \\ \times\ \ 9 \\ \hline \end{array}$ $\begin{array}{r} 7.18 \\ \times\ \ 4 \\ \hline \end{array}$

2. $\begin{array}{r} 3.8 \\ \times\ \ 4 \\ \hline \end{array}$ $\begin{array}{r} .92 \\ \times\ \ 9 \\ \hline \end{array}$ $\begin{array}{r} 6.7 \\ \times\ \ 6 \\ \hline \end{array}$ $\begin{array}{r} 5.3 \\ \times\ \ 8 \\ \hline \end{array}$ $\begin{array}{r} .84 \\ \times\ \ 7 \\ \hline \end{array}$

3. $\begin{array}{r} 41 \\ \times\ .03 \\ \hline \end{array}$ $\begin{array}{r} 78 \\ \times\ \ .5 \\ \hline \end{array}$ $\begin{array}{r} 59 \\ \times\ .09 \\ \hline \end{array}$ $\begin{array}{r} 86 \\ \times\ \ .4 \\ \hline \end{array}$ $\begin{array}{r} 19 \\ \times\ .06 \\ \hline \end{array}$

Activity 16 - Multiplying Decimals

(3) Directions: Find the products in the problems below.

1.	.09	.05	.004	.08	.002
	x .6	x .7	x .3	x .04	x .8
2.	2.8	5.6	.72	.81	.94
	x 4.3	x .82	x 5.7	x .69	x 1.8
3.	41.8	3.90	.516	73.8	3.47
	x .7	x .08	x .5	x .06	x .4

Activity 16 - Multiplying Decimals

(4) Directions: Multiply.

1.	$\begin{array}{r} 5.6 \\ \text{x } .2 \\ \hline \end{array}$	$\begin{array}{r} .73 \\ \text{x } .08 \\ \hline \end{array}$	$\begin{array}{r} 9.2 \\ \text{x } .7 \\ \hline \end{array}$	$\begin{array}{r} .087 \\ \text{x } .4 \\ \hline \end{array}$	$\begin{array}{r} 3.3 \\ \text{x } .06 \\ \hline \end{array}$
2.	$\begin{array}{r} 30.5 \\ \text{x } .27 \\ \hline \end{array}$	$\begin{array}{r} 7.40 \\ \text{x } 6.6 \\ \hline \end{array}$	$\begin{array}{r} 61.8 \\ \text{x } 4.8 \\ \hline \end{array}$	$\begin{array}{r} .514 \\ \text{x } .91 \\ \hline \end{array}$	$\begin{array}{r} 9.06 \\ \text{x } 7.3 \\ \hline \end{array}$
3.	$\begin{array}{r} 906 \\ \text{x } .07 \\ \hline \end{array}$	$\begin{array}{r} 504 \\ \text{x}.002 \\ \hline \end{array}$	$\begin{array}{r} 783 \\ \text{x } .8 \\ \hline \end{array}$	$\begin{array}{r} 652 \\ \text{x } .06 \\ \hline \end{array}$	$\begin{array}{r} .467 \\ \text{x}.003 \\ \hline \end{array}$

Activity 16 - Multiplying Decimals

(5) Directions: Multiply.

1.	$\begin{array}{r} .02 \\ \times\ \ .8 \\ \hline \end{array}$	$\begin{array}{r} .25 \\ \times\ .04 \\ \hline \end{array}$	$\begin{array}{r} 1.2 \\ \times\ .008 \\ \hline \end{array}$	$\begin{array}{r} .073 \\ \times\ .05 \\ \hline \end{array}$
2.	$\begin{array}{r} 14.21 \\ \times\ 35 \\ \hline \end{array}$	$\begin{array}{r} .216 \\ \times\ .24 \\ \hline \end{array}$	$\begin{array}{r} 17.7 \\ \times\ 2.5 \\ \hline \end{array}$	$\begin{array}{r} 3.2 \\ \times\ 87 \\ \hline \end{array}$
3.	$\begin{array}{r} 547.1 \\ \times\ .73 \\ \hline \end{array}$	$\begin{array}{r} 3.07 \\ \times\ 731 \\ \hline \end{array}$	$\begin{array}{r} 17.39 \\ \times\ 12.4 \\ \hline \end{array}$	$\begin{array}{r} 1.754 \\ \times\ .23 \\ \hline \end{array}$
4.	$\begin{array}{r} 4.08 \\ \times\ .0017 \\ \hline \end{array}$	$\begin{array}{r} .0125 \\ \times\ .315 \\ \hline \end{array}$	$\begin{array}{r} .468 \\ \times\ .1302 \\ \hline \end{array}$	$\begin{array}{r} .12121 \\ \times\ .03 \\ \hline \end{array}$

Activity 16 - Multiplying Decimals

(6) Directions: Multiply.

1.	17.32 x .16	.0648 x 2.3	913.2 x .049	40.21 x 20.8
2.	45.21 x 5.6	3.748 x 73	206.9 x .28	.7488 x 4.9
3.	.2789 x .17	3.845 x 29.2	5183.6 x .0016	303.003 x 56.8

Activity 16 - Multiplying Decimals (continued)

You need to know:

EXAMPLES

45. 8 x 10 = 45.8 = 458.

45.8 x 100 = 45.80 = 4,580.

45.8 x 1,000 = 45.800 = 45,800

.136 x 10 = .1 36 = 1.36

.136 x 100 = .13 6 = 13.6

.136 x 1,000 = .136 = 136.

Activity 16 - Multiplying Decimals By 10, 100, or 1,000

(7) Directions: Use the shortcut to multiply each of the following problems.

1. 10 x 7.6 = ____________________
2. 100 x .013 = ____________________
3. 10 x 7.64 = ____________________
4. 10 x .013 = ____________________
5. 10 x .7839 = ____________________
6. 100 x .002 = ____________________
7. 1,000 x .7839 = ____________________
8. 10 x .9084 = ____________________
9. 1,000 x .7839 = ____________________
10. 1,000 x 908.4 = ____________________
11. 10 x 7.9 = ____________________
12. 100 x 90.84 = ____________________

Activity 16 - Multiplying Decimals By 10, 100, or 1,000

(8) Directions: Multiply each of the following problems using the shortcut.

1. .2 x 10 = ____________________
2. 45.06 x 100 = ____________________
3. 72.4 x 100 = ____________________
4. .35 x 10 = ____________________
5. .539 x 100 = ____________________
6. .457 x 1,000 = ____________________
7. .05 x 100 = ____________________
8. 42.4 x 100 = ____________________
9. 86.73 x 1,000 = ____________________
10. 2.97 x 100 = ____________________
11. 22.8 x 1,000 = ____________________
12. .9 x 1,000 = ____________________

Activity 16 - Multiplying Decimals By 10, 100, or 1,000

(9) Directions: Multiply each of the following problems using the shortcut.

1) .34 x 10 = 1.24 x 100 = 3.85 x 1,000 =

2) .03 x 100 = .275 x 100 = 8.9 x 100 =

3) .8 x 10 = .09 x 10 = 3.64 x 10 =

4) .9 x 1,000 = 2.36 x 1,000 = .475 x 1,000 =

5) .06 x 1,000 = .863 x 100 = .721 x 10 =

6) 1.6 x 1,000 =

Cluster
Applied Math

Activity 17 - Dividing Decimals By Whole Numbers

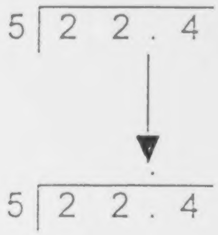
Objective(s): This activity will enable participants to divide decimals by whole numbers.

Materials Required:
Pencil
Scratch Paper

You need to know: To divide decimals by whole numbers...

1. Place the decimal point up in the quotient (answer) directly above its position in the dividend (problem).

EXAMPLE



2. Divide as you would whole numbers until all digits of the dividend have been used.

$$\begin{array}{r} 4.4 \\ 5\overline{)22.4} \\ \underline{20} \\ 2\,4 \\ \underline{2\,0} \\ 4 \end{array}$$

Activity 17 - Dividing Decimals By Whole Numbers (continued)

4. Suppose you were asked to calculate the average machine downtime for each of the 7 production lines in the Richmond bakery on a given day. You would divide the total downtime hours by the number of lines. Round the answer to the nearest hundredth.

EXAMPLE $7\overline{)\;28.6}$

Total Machine Downtime Hours	28.6
Number Of Lines	7

```
          4 . 0  8  5    = 4.09   Answer
     7 | 2  8 . 6  0
         2  8
         ---------
                6
                0
              -------
                6  0
                5  6
              --------
                   4  0
                   3  5
                 ------
                      5
```

5. To divide decimals by 10, 100, or 1,000...
   a. count the number of zeros in 10, 100, or 1,000.
   b. move the decimal point to the left as many places as there are zeros in 10, 100, or 1,000.
   c. write in additional ending zeros, if necessary.

4.63 ÷ 10 = .4 63 = .463

29.5 ÷ 100 = 2 9 5 = .295

.075 ÷ 1,000 = 0 0 0 075 = .000075

Activity 17 - Dividing Decimals By Whole Numbers (continued)

You need to know:

3. Write the remainder over the divisor as a fraction.

$$\begin{array}{rl}
 & 4.4\,\bigcirc\!\!\!\!\!\tfrac{4}{5}\\
5 & \overline{\big)22.4}\\
 & \underline{20}\\
 & 24\\
 & \underline{20}\\
 & 4
\end{array}$$

OR

Divide further by adding ending zeros.

$$\begin{array}{rl}
 & 4.48\\
5 & \overline{\big)22.40}\\
 & \underline{20}\\
 & 24\\
 & \underline{20}\\
 & 40\\
 & \underline{40}
\end{array}$$

Activity 17 - Dividing Decimals By Whole Numbers

(1) Directions: Find the quotients in the problems below.

1. $3\overline{).27}$ $2\overline{).492}$ $27\overline{)85.32}$ $12\overline{).150}$

2. $5\overline{).45}$ $6\overline{)36.12}$ $34\overline{)356.32}$ $8\overline{).526}$

3. $8\overline{).56}$ $12\overline{)74.76}$ $64\overline{)58.56}$ $76\overline{)12.54}$

Activity 17 - Dividing Decimals By Whole Numbers

(2) Directions: Find the quotients in the problems below.

1. $8\overline{).192}$ $3\overline{)148.8}$ $5\overline{)19.45}$ $4\overline{)2.524}$

2. $6\overline{)13.8}$ $9\overline{)70.2}$ $4\overline{).384}$ $7\overline{)57.75}$

3. $16\overline{)76.8}$ $21\overline{)7.56}$ $19\overline{)1.52}$ $38\overline{)216.6}$

4. $52\overline{)9.516}$ $43\overline{)1565.2}$ $77\overline{)464.31}$ $65\overline{)33.605}$

Activity 17 - Dividing Decimals By 10, 100, or 1,000

(3) Directions: Find the quotients using the shortcut.

1. .62 ÷ 10 = ______ 5.74 ÷ 100 = ______

2. .3 ÷ 10 = ______ 12.09 ÷ 100 = ______

3. .08 ÷ 100 = ______ .834 ÷ 100 = ______

4. 21.6 ÷ 100 = ______ 38.6 ÷ 1,000 = ______

5. 84.7 ÷ 100 = ______

Activity 17 - Dividing Decimals By 10, 100, or 1,000

(4) Directions: Find the quotients using the shortcut.

1. 7.7 ÷ 10 = ______ .14 ÷ 10 = ______

2. 52.9 ÷ 100 = ______ 64.7 ÷ 1,000 = ______

3. .239 ÷ 1,000 = ______ 58.09 ÷ 1,000 = ______

4. 8.306 ÷ 100 = ______ 50.73 ÷ 1,000 = ______

5. .4 ÷ 1,000 = ______

Activity 18 - Dividing Decimals By Decimals

Objective(s): This activity will enable participants to divide decimals by decimals.

Materials Required:
Pencil
Scratch Paper

You need to know: To divide decimals by decimals...

1. Make the divisor a whole number by moving the decimal point to the right as far as it will go.

   EXAMPLE

   $$7.5\,\overline{)\,2.25} \qquad\qquad 7\,.\,5\,\overline{)\,2.25}$$

2. Move the decimal point in the divident the same number of places to the right that you moved the point in the divisor.

   $$7\,.\,5\,\overline{)\,2.2\ \,5}$$

3. Place a decimal point in the quotient directly above its new position in the dividend.

   $$\begin{array}{r} .\ \ \ \ \\ 7\,.\,5\,\overline{)\,2.2\ \,5} \end{array}$$

Activity 18 - Dividing Decimals By Decimals (continued)

You need to know:

4. Divide as you would divide a decimal by a whole number.

$$\begin{array}{r} .3 \\ 75\overline{)22.5} \\ 22\ 5 \end{array}$$

5. Sometimes it is necessary to add ending zeros to the dividend in order to have enough places to move the decimal point. Create the same number of places in the dividend as are in the divisor. Continue dividing until quotient has as many places as are required for the answer.

EXAMPLE

$$.008\overline{)44.8}$$

$$\begin{array}{rl} & 5600. \\ .008 & \overline{)44.800} \\ & 40 \\ \hline & 48 \\ & 48 \\ \hline & 0 \\ & 0 \\ \hline & 0 \\ \hline & 0 \end{array}$$

Activity 18 - Dividing Decimals By Decimals (continued)

6. To check your answers, multiply the quotient by the original divisor (the decimal). You should get the dividend.

CHECK

5600	quotient
x .008	original divisor
44.800	dividend

Activity 18 - Dividing Decimals By Decimals

(3) Directions: Find the quotients in the problems below.

1. $.8\overline{)7.68}$ $.7\overline{)26.6}$

2. $4.1\overline{)1.148}$ $9.2\overline{)128.8}$

3. $.06\overline{)0.882}$ $.28\overline{).5404}$

4. $8.7\overline{).522}$ $.19\overline{).3933}$

Activity 18 - Dividing Decimals By Decimals

(4) Directions: Find the quotients in the problems below. Check your answers.

1. $.007\overline{)5.32}$ $.009\overline{)4.32}$

2. $.016\overline{)212.8}$ $.025\overline{).1}$

3. $.003\overline{)8.1}$ $.008\overline{)77.12}$

4. $.091\overline{)65.52}$ $.68\overline{)57.8}$

Activity 18 - Dividing Decimals By Decimals

(5) Directions: Divide and check.

1. $.0018\overline{)1.683}$ $.0073\overline{)15.184}$

2. $.0024\overline{).78}$ $.0006\overline{)42.84}$

3. $.008\overline{)4.48}$ $.06\overline{)558.6}$

4. $.32\overline{)156.8}$ $.45\overline{)1381.5}$

Activity 18 - Dividing Decimals By Decimals

(2) Directions: Find the quotients in the problems below.

1. $.6\overline{)0.42}$ $.4\overline{)2.76}$

2. $5.3\overline{)4.399}$ $3.2\overline{)0.288}$

3. $.75\overline{)453.75}$ $.52\overline{)6.656}$

4. $3.6\overline{)145.44}$ $.64\overline{).11648}$

Activity 18 - Dividing Decimals By Decimals

(1) Directions: Find the quotients in the problems below.

1. .4⟌.8   .07⟌4.921   .25⟌16.5   4.4⟌82.28

2. .15⟌.45   .6⟌72.18   .06⟌5.6   .08⟌170.4

3. .12⟌1.56   1.04⟌93.8   6.8⟌44.2   3.8⟌62.7

Activity 19 - Calculating Percent of Oil

All ingredients in a product must be added in the amount specified by the master recipe. By doing so, consistency is maintained in the product and the product complies with labeling information provided for the consumer.

For instance the correct amount of spray oil on a product must be monitored. To perform this calculation you need to take weights, read the scale, subtract, divide, and multiply.

Step 1:
Record the dry weight of the product

Step 2:
Record the wet weight of the product (after the oil spray machine)

Step 3:
Subtract the dry weight from the wet weight

Step 4:
Divide the wet weight into the answer for step 3

Step 5:
Multiply your answer by 100. The answer is the percent of oil in that sample.

Now try the following:

	Wet Wt.	Dry Wt.	% Oil
1.	50	45	________
2.	69	63	________
3.	100	90	________
4.	112	110	________

Activity 20 - Calculating Cubic Footage

When working in Environmental Services, an employee must sometimes spray designated areas to prevent infestation. The chemicals must be used according to the label directions for the amount of space to be sprayed. Therefore, the cubic footage of the area to be sprayed must be determined.

To calculate cubic footage you must be able to measure width, length, height and then multiply.

If a room measures 70 feet by 80 feet and is 20 feet high, you multiply.
70 X 80 X 20 = 112,000 cubic feet.

Find the cubic footage of the following rooms.

Room A measures
100 ft. long, 45 ft. wide, 25 feet tall __________cu. ft.

Room B measures
12 ft. wide, 15 ft. long, 8 ft. tall __________cu. ft.

Room C measures
35.5 ft. long, 22.25 ft. wide, 12 ft. tall __________cu. ft.

Activity 21 - Calculating Sprays

An Environmental Services employee must sometimes use a spraying device for tasks such as administering pesticides. How much liquid you put in the spraying device is determined by the label directions and the amount of area or space to be sprayed.

First, you must calculate the space as you did in the previous activity. Next, you follow label directions, using division to calculate the amount of liquid to pour into the tank.

For instance, if the area to be sprayed is 10,000 cubic feet, and one gallon sprays 5,000 cubic feet, you will need 2 gallons, because

$10,000 \div 5,000 = 2$

Use the room measurements in the previous activity to calculate how many gallons of liquid will be needed if one gallon is necessary for 1000 cubic feet.

Room A __________gallons

Room B __________ gallons

Room C __________ gallons

Cluster_____

Activity 1: Learning Military Time

Objective (s): This activity will enable participants

1. To become familiar with military time (24 hour clock time)

2. To understand how military time is organized

Materials Used: Pencils, Paper
Military Time Reference Sheet

You Need to Know:

In grade school we were all very proud when we learned how to tell time. We learned the purpose of the minute and hour hands on a regular manual clock. Then the digital display clocks came along and made it even easier for us to tell time.

However, there is another way to express the time of day and that is in military time. Military time denotes the number of hours into a new day and adds "hundred" as a suffix. For example, 12 noon, midday is expressed as 1200 hours - 12 hours into a new day followed by the phrase "hundred hours."

Many companies require that their employees use a "time-clock" that records hours worked in military time. Various areas of the Nabisco Facility use military time. For example, the Mixing Department uses this 24-hour clock method to calculate lay time, which is the time between the mixing and dumping of the dough. On the following page you will find a **Military Time Reference Sheet** that shows the equivalent conventional time. Take a few moments to review that sheet.

MILITARY TIME REFERENCE SHEET

Conventional Time			Military Time
AM	12:00	midnight	2400 hours
	12:01	1-minute past midnight	0001 hours
	12:10	10 minutes past midnight	0010 hours
	1:00	1-O'clock in the morning	0100 hours
	2:00	2-O’clock in the morning	0200 hours
	2:30	2:30 in the morning	0230 hours
	3:00	3-O'clock in the morning	0300 hours
	4:00	4-O’clock in the morning	0400 hours
	5:00	5-O'clock in the morning	0500 hours
	6:00	6-O'clock in the morning	0600 hours
	7:00	7-O'clock in the morning	0700 hours
	8:00	8-O'clock in the morning	0800 hours
	9:00	9-O'clock in the morning	0900 hours
	10:00	10-O'clock in the morning	1000 hours
	11:00	11-O'clock in the morning	1100 hours
PM	12:00	noon, midday	1200 hours
	12:18	18-minutes past noon	1218 hours
	12:45	45-minutes past 12 noon	1245 hours
	1:00	1-O'clock in the afternoon	1300 hours
	1:05	5-minutes after 1 p.m.	1305 hours
	2:00	2-O'clock in the afternoon	1400 hours
	3:00	3-O'clock in the afternoon	1500 hours
	4:00	4-O'clock in the afternoon	1600 hours
	5:00	5-O'clock in the afternoon	1700 hours
	6:00	6-O'clock in the afternoon	1800 hours
	7:00	7-O'clock in the evening	1900 hours
	8:00	8-O'clock in the evening	2000 hours
	9:00	9-O'clock in the evening	2100 hours
	10:00	10-O'clock in the evening	2200 hours
	11:00	11-O'clock in the evening	2300 hours
	11:03	3-minutes past 11 at night	2303 hours
	11:22	22-minutes past 11 at night	2322 hours
	11:47	47 minutes past 11 at night	2347 hours

Activity 2 - Working with the Military Time Reference Sheet

Objective (s): This activity will enable participants

1. To become familiar with military time

2. To understand how military time is organized

Materials Used: Pencils, Paper, Military Time Reference Sheet

Directions

Look at the Military Time Reference Sheet. Observe the progression of the time and hours. For example, 12 noon by conventional time is the same as 1200 (12-hundred) hours in military hours. Locate that time on your reference sheet. The next time on the sheet is 12:18 p.m. or 1218 hours (18 minutes after 12 noon). Now complete the worksheet below by writing in the missing information. You may use your reference sheet.

Military Time Worksheet

Conventional Time			Military Time
AM	12:00	midnight	2400 hours
	12:01	1-minute past midnight	
	12:10	10 minutes past midnight	0010 hours
	1:00	1-O'clock in the morning	
	2:00	2-O’clock in the morning	0200 hours
	2:30	2:30 in the morning	
	3:00	3-O'clock in the morning	0300 hours
	4:00	4-O’clock in the morning	
	5:00	5-O'clock in the morning	
	6:00	6-O'clock in the morning	0600 hours
	7:00	7-O'clock in the morning	
	8:00		
	9:00	9-O'clock in the morning	0900 hours
	10:00	10-O'clock in the morning	
	11:00	11-O'clock in the morning	1100 hours

Activity 2 Continued...

Military Time Worksheet

Conventional Time			Military Time
PM	12:00	noon, midday	1200 hours
	12:18	18-minutes past noon	
	12:45	45-minutes past 12 noon	1245 hours
	1:00	1-O'clock in the afternoon	
	1:05	5-minutes after 1 p.m.	1305 hours
	2:00	2-O'clock in the afternoon	
	3:00		
	4:00	4-O'clock in the afternoon	1600 hours
	5:00	5-O'clock in the afternoon	
	6:00	6-O'clock in the afternoon	1800 hours
	7:00	7-O'clock in the evening	
	18:00	8-O'clock in the evening	2000 hours
	9:00		
	10:00	10-O'clock in the evening	2200 hours
	11:00	11-O'clock in the evening	
	11:03	3-minutes past 11 at night	
	11:22	22-minutes past 11 at night	2322 hours
	11:47		

Activity 3 - Translating Conventional Time to Military Time

Objective (s): This activity will enable participants

1. To record military time

2. To translate conventional time to military time

Materials Used: Pencils, Paper
Military Time Reference Sheet

Directions

Write the correct military time in the blank spaces.

A. **Military Time Translation**

Conventional Time		Military Time
AM	12:00	
	12:01	
	12:10	
	1:00	
	2:30	
	11:00	

B.

Military Time Translation

Conventional Time		Military Time
PM	12:00	
	12:10	
	1:00	
	2:00	
	4:17	
	11:00	

Activity 4 - Using Military Time in the Workplace

Objective (s): This activity will enable participants

1. To record military time

2. To translate conventional time to military time

Materials Used: Pencils, Paper, Military Time Reference Sheet

Directions

Read the work schedule below and write in the military time for the hours sanitation employees must clean the locker rooms and lounges each day. Write the military time in the spaces provided. Use your military reference sheet, if necessary.

Work Schedule

Military Time

First Shift

7:30 a.m. ______________

9:30 a.m. ______________

11:00 a.m. ______________

1:00 p.m. ______________

2:30 p.m. ______________

Activity 4 - Using Military Time in the Workplace

Second Shift

3:30 p.m. ________________

5:30 p.m. ________________

7:30 p.m. ________________

9:00 p.m. ________________

10:30 p.m. ________________

Third Shift

11:30 p.m. ________________

1:30 a.m. ________________

3:30 a.m. ________________

5:30 a.m. ________________

6:30 a.m. ________________

Activity 5 - Recording Military Time

Objective (s): This activity will enable participants

1. To record military time
2. Translate military time to conventional time

Materials Used: Pencils, Paper, Military Time Reference Sheet

Directions

Read the paragraphs below and write in the military time translation for the conventional time noted.

1. Clara plans to purchase a car at Nicker's Chevrolet today. She is going to meet John at 2:35 p.m. at the dealership. How is 2:35 p.m. expressed in military time?______________.

2. It took 10 hours to produce a cookie. If John started at 7:00 a.m., what time did he finish the process? Write the time he started and the completion time in military time. Start time:___________; Completion time: ___________.

3. Jack is interviewing six people for jobs in the bakery. He intends to spend one hour with each person. Jack does not know military time. Help Jack by changing the military time to conventional time.

0900 hours ______________

1100 hours ______________

1400 hours ______________

1800 hours ______________

1900 hours ______________

2100 hours ______________

Activity 6- Using flash cards to learn military time

Objective (s): This activity will enable participants

1. To practice the use of military time
2. To Translate conventional time into military time

Materials Used: Pencils, Paper, Military Time Flash Cards

Directions

Ask your facilitator for a set of flash cards. Take one card from the stack and look at each side. Please note that one side has the conventional time and the other side has the military time. Use the flash cards to challenge yourself. You will need a blank sheet of paper to write your answers. Now, take another card from the stack. Look at the conventional side of the card. Do not look at the nswer on the military side. Write your answers on your sheet of paper. Continue this process until you have selected at least 20 cards. Then check your answers.

Activity 7 - Recording Military Time

Objective (s): This activity will enable participants

1. To record military time
2. Translate conventional time into military time
3. Practice using military time to complete work tasks

Materials Used: Pencils, Paper, Military Time Reference Sheet

Directions

Read the paragraph and write in the military time for the conventional time. Write the translation in the parenthesis provided. Do not use your military reference sheet.

John is a worker in the Mixing Department. On Tuesday, he reports to that department at 5:00 a.m. (__________**hours**). However, he was late and he clocked in at 5:30 a.m. (_______**hours**).

After talking to his supervisor for one half-hour. He actually started work at 6:00 a.m. (________**hours**). His task for the day was to mix dough for Vanilla Wafers. He takes one-hour to mix the dough. It is now 7:00 a.m. (_______**hours**). According to his procedures, the dough must stand for six hours before it is dumped. The dough will be dumped at 1:00 p.m. (_______**hours**).

John Miller clocks out at that time. Therefore, Mary will dump the dough. Mary dumped the dough on time. Then she went to on break at 2:30 p.m. (________**hours**). She returned at 2:45 p.m. (______**hours**).

Mary took her lunch break at 4:30 p.m. (______**hours**). She returned at 5:30 p.m. (_______**hours**). At 8:30 p.m., ______**hours**) Mary's day came to an end. She clocked out. It took her 20 minutes to get home. She arrived at home at 8:50 p.m. (______**hours**).

On Wednesday, Mary will work the third shift. She must report to work at 11:00 p.m. (______**hours**). John will work the second shift. He reports to work at 3:00 p.m. (______**hours**). He intends to be on time. So, he leaves home one hour early. John will leave home at 2:00 p.m. (______**hours**).

ANSWER SHEET

Exercise 2: Military Time Worksheet (Answers in bold print)

Conventional Time			Military Time
AM	12:00	midnight	2400 hours
	12:01	1-minute past midnight	0001 hours
	12:10	10 minutes past midnight	0010 hours
	1:00	1-O'clock in the morning	0100 hours
	2:00	2-O'clock in the morning	0200 hours
	2:30	2:30 in the morning	0230 hours
	3:00	3-O'clock in the morning	0300 hours
	4:00	4-O'clock in the morning	0400 hours
	5:00	5-O'clock in the morning	0500 hours
	6:00	6-O'clock in the morning	0600 hours
	7:00	7-O'clock in the morning	0700 hours
	8:00	8-O'clock in the morning	0800 hours
	9:00	9-O'clock in the morning	0900 hours
	10:00	10-O'clock in the morning	1000 hours
	11:00	11-O'clock in the morning	1100 hours
PM	12:00	noon, midday	1200 hours
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	12:45	45-minutes past 12 noon	1245 hours
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	1:05	5-minutes after 1 p.m.	1305 hours
	2:00	2-O'clock in the afternoon	1400 hours
	3:00	3-O'clock in the afternoon	1500 hours
	4:00	4-O'clock in the afternoon	1600 hours
	5:00	5-O'clock in the afternoon	1700 hours
	6:00	6-O'clock in the afternoon	1800 hours
	7:00	7-O'clock in the evening	1900 hours
	18:00	8-O'clock in the evening	2000 hours
	9:00	9-O'clock in the evening	2100 hours
	10:00	10-O'clock in the evening	2200 hours
	11:00	11-O'clock in the evening	2300 hours
	11:03	3-minutes past 11 at night	2303 hours
	11:22	22-minutes past 11 at night	2322 hours
	11:47	47 minutes past 11 at night	2347 hours

Activity 3a. 2400 hours, 0001 hours, 0010 hours, 0100 hours, 0230 hours, 1100 hours.

Activity 3b. 1200 hours, 1210 hours, 1300 hours, 1400 hours, 1617 hours, 2300 hours

Activity 4. First Shift: 0730 hours, 0930 hours, 1100 hours, 1300 hours, 1430 hours. Second Shift: 1530 hours, 1730 hours, 1930 hours, 2100 hours, 2230 hours. Third Shift: 2330 hours, 0130 hours, 0330 hours, 0530 hours, 0630 hours.

Activity 5. 1. 1435 hours 2. started at 0700 hours (7:00 a.m.), finished at 1700 hours (5:00 p.m.). 3. 9:00 a.m., 11:00 a.m., 2:00 p.m., 6:00 p.m. 7:00 p.m.,9:00 p.m.

Activity 6. Flash Cards. See answers on back of flash cards.

Activity 7. 0500 hours, 0530 hours, 0600 hours, 0700 hours, 1300 hours, 1430 hours, 1445 hours, 1630 hours, 1730 hours, 2030 hours, 2050 hours, 2300 hours, 1500 hours, and 1400 hours.

Graph Comprehension

Activity 1 - Understanding the Purpose and Use of Graphs

Objective (s): Participants will be able to

1. Become familiar with the purpose of graphs
2. Become familiar with the different types of graphs

Material Needed: Pencil

You Need to Know:

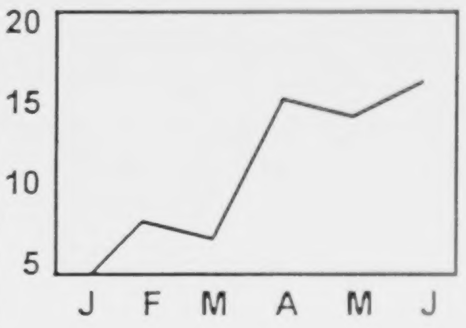
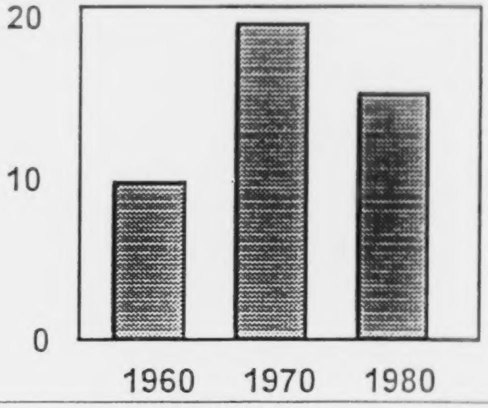
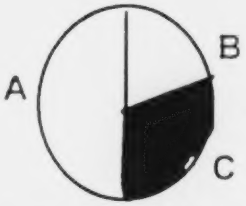
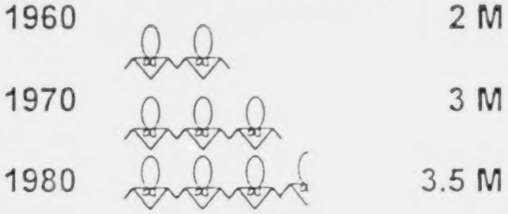
As we go about our everyday activities, we find it necessary to read charts, tables, and other graphic displays to gain information. For example, at the grocery store, we read nutrition facts tables on the back of cereal boxes. Likewise, at the Nabisco Facility employees read control charts, time charts, dials, gauges, thermometers and etc.

Photographs, drawings, cartoons, graphs, charts, diagrams, tables, and maps appear in all kinds of materials today. All of the visual aids mentioned above help us to understand and receive information. Graphs are used to show how number values relate. They are used in business reports, magazines, and even on television during the weather report. **Therefore, graphs are visual representations of information that show comparisons and relationships**.

The purpose of graphs is to clarify concepts that are presented about numerical data. Most people can understand information better when it is presented graphically. Modern textbooks and employee training manuals include graphic displays. Written text often appears to be more interesting to read when graphics are included.

Directions:
Turn to the next page. Read about the different types of graphs and their purpose.

Activity 1 - Understanding the Purpose of Graphs

Types of Graphs	Description & Purpose
Line  	Shows precise relationship between two sets of data. Each point (data point or dot) on the line graph represents the two items in relation to each other. This is the most accurate type of graph. It shows how a trend may be taking place. For example, the fluctuation of bag weights of Oreo cookies over a period of time.
Bar  	A bar graph allows you to show comparisons of values taken at different times or representing different age groups, sexes, product attributes, etc. The bars may be vertical (up and down) or horizontal (side to side). The bars may also be subdivided into parts of a whole or into percentages.
Pie (Circle)  	A pie graph is most commonly known as a circle graph or pie chart. It shows how various parts relate to a whole (100%) and shows percentages. One part of the circle graph is called a slice.
Pictograph (Pictogram)  	Often called a picture graph, a pictogram is the easiest to read, but is difficult to draw. It shows approximate comparisons as bar graphs do, but uses representational figures such as cars, people, or other items being compared.

Activity 2 - Identifying different types of Graphs

Objective(s): Participants will be able to

1. Identify different types of graphs

Materials Needed: Pencil

You Need to Know:

There are many types of graphs used in manufacturing industry. The majority of graphs fall into one of four types: line, bar, pie (circle) or pictograph. Each type of graph has certain advantages. For example, a circle graph is used to show how various items are part of a whole (percentage of 100%). However, a line graph is used to show a trend of the price of sugar. The type of graph used to display information depends on the type and quantity of data that is being presented.

Directions: In the previous activity you learned about four kinds of graphs. First, think of where you may have seen a particular type of graph in the bakery. Then think of where else you may have seen such a graph. Fill in the blank with the department or location.

I have seen examples of line graphs in the______________department.
I have seen examples of line graphs ___________________________.

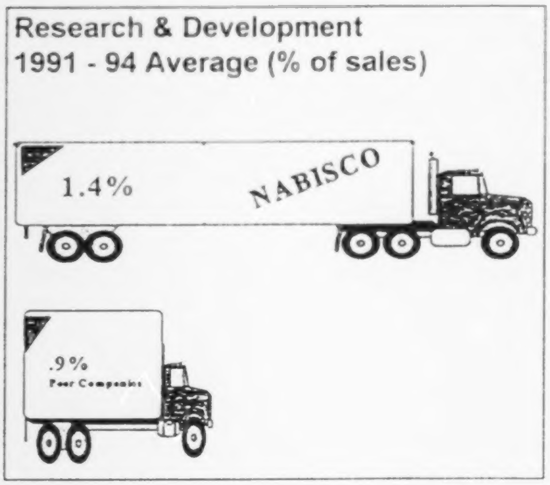
I have seen examples of bar graphs in the _______________department.
I have seen examples of bar graphs __________________________.

I have seen examples of pie charts in the_________________department.
I have seen examples of pie charts __________________________.

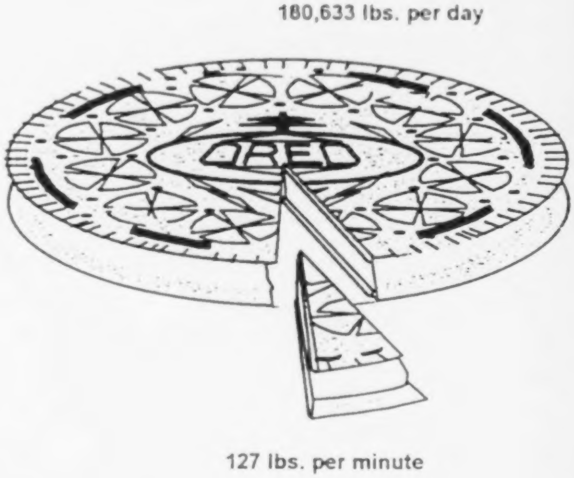
I have seen examples of pictographs in the________________department.
I have seen examples of pictographs __________________________.

Activity 2 - Identifying different types of Graphs, Continued

Directions:
Review the different types of graphs or visual displays below and on the following pages. In the blank spaces provided, identify the type of graph. If you need help, refer back to the first activity.


Research & Development
1991 - 94 Average (% of sales)

Rate of OREO Production (In LBS.)

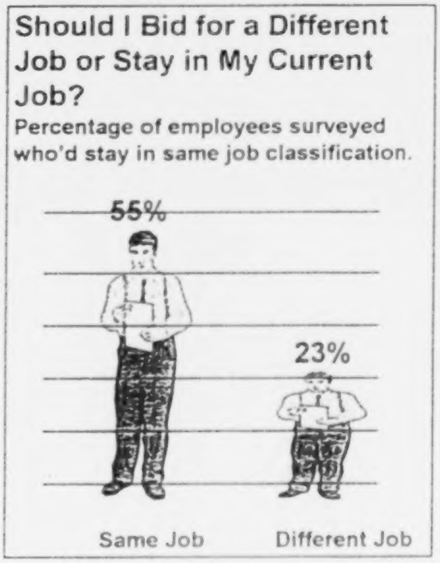


A. ______________________________

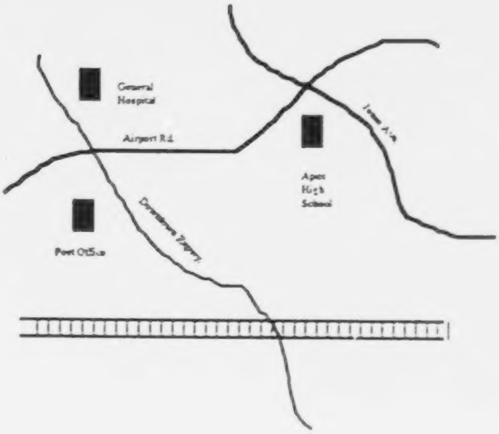
B. ______________________________

	PHONE COSTS - ☎ = $10,000
1994	☎ ☎ ☎ ☎ ☎ ☎ ☎
1993	☎ ☎ ☎ ☎ ☎
1992	☎ ☎ ☎ ☎
1991	☎ ☎ ☎ ☎

C. ______________________________

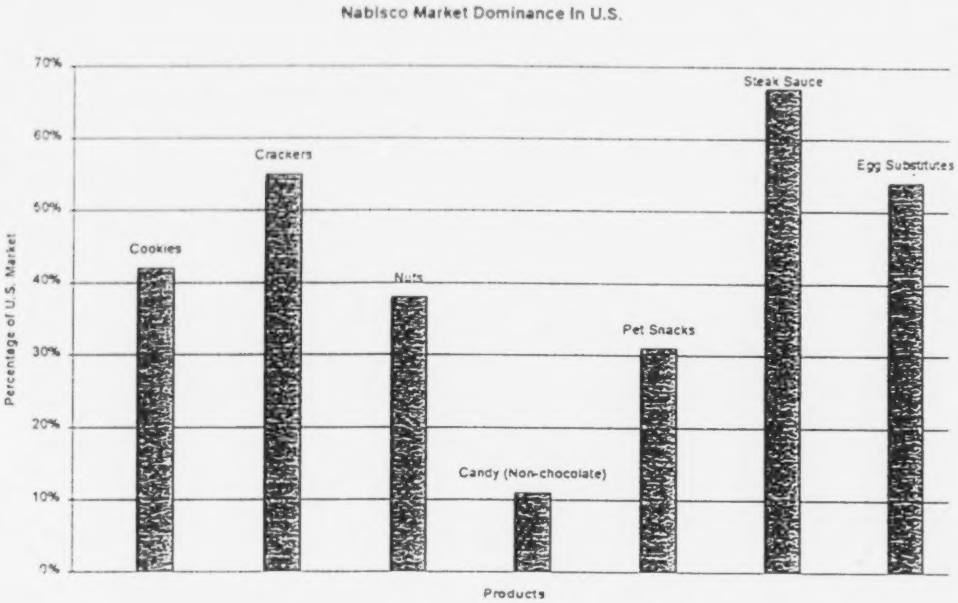

Should I Bid for a Different Job or Stay in My Current Job?

Percentage of employees surveyed who'd stay in same job classification.

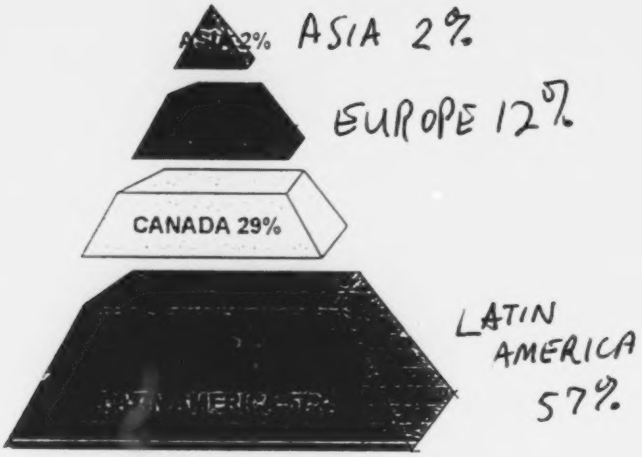

General Hospital
Airport Rd.
Iowa Ave.
Apex High School
Downtown Bypass
Post Office

E. ______________________________

D. ________________________


Nabisco Market Dominance In U.S.

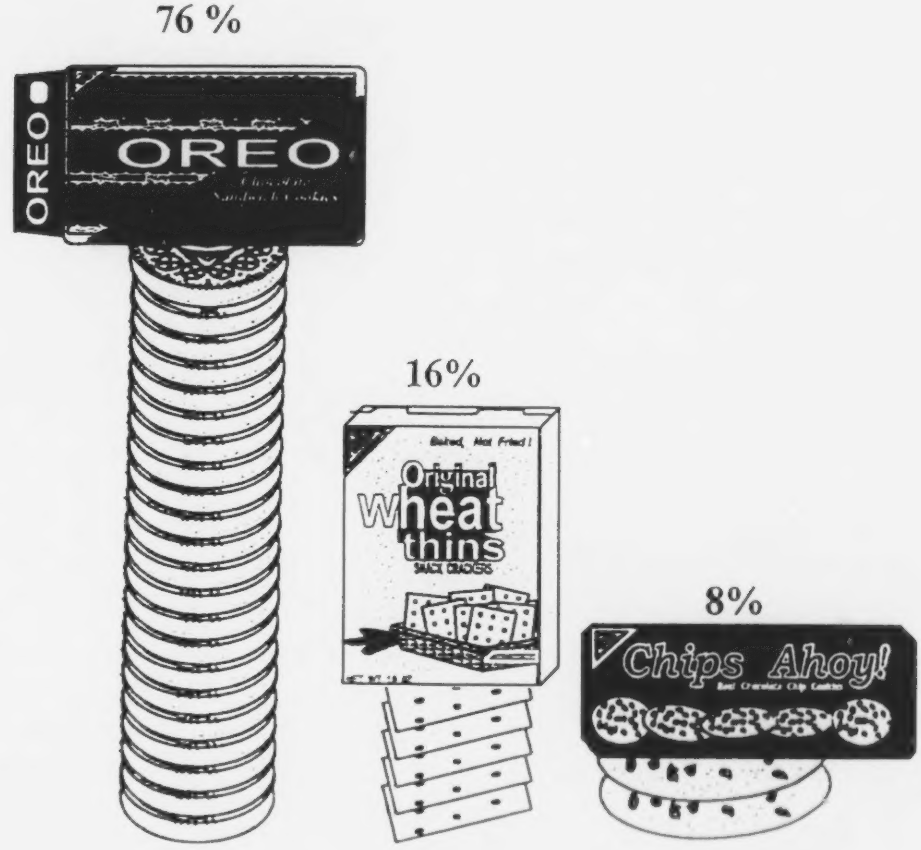
F. ______________________________________



NABISCO INTERNATIONAL SALES

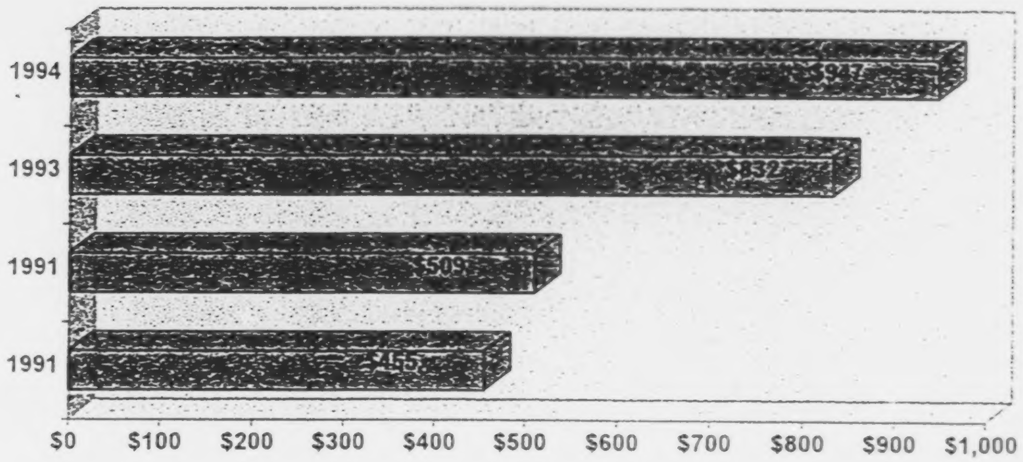
G. ______________________________

A group of 25 Richmond, VA third graders compared their favorite Nabisco products. Thei data are graphed below.



H. ______________________

Nabisco New Product Sales in the U.S.
(in millions)



I. ______________________

Activity 3 - Learning to Read Graphs

Objective(s): Participants will be able to

1. Become familiar with general tips for reading graphs

Materials Needed: Pencil

You Need to Know:

Tips for reading graphs

1. Notice the title and type of graph you're reading. The title will tell you the purpose and main idea.
2. Notice the arrangement of the data (numerical values). Read the vertical and horizontal column headings to get an understanding of what is being compared. For example, a graph may compare the amount of salt used in the Ritz cracker with the Sociables.
3. Notice the scale. What are the increments (number of spaces) of increase or decrease? Be aware of any fluctuation of the data. Look at the pattern of the data points.
4. Read the key (same as legend). It tells you the meaning of the symbols. Color coding and surface patterns are important. For example, look at heavy shading, dots, crossed lines etc.
5. Notice the symbols being used. This is particularly important with pictographs. Some symbols are decorative or may be very meaningful. That's why it is so important to check the key.
6. Read any text around the graph. Relate the graph to any written text. Do some critical thinking. Draw conclusions based on the data presented only. Ask yourself, what comparisons are being made?

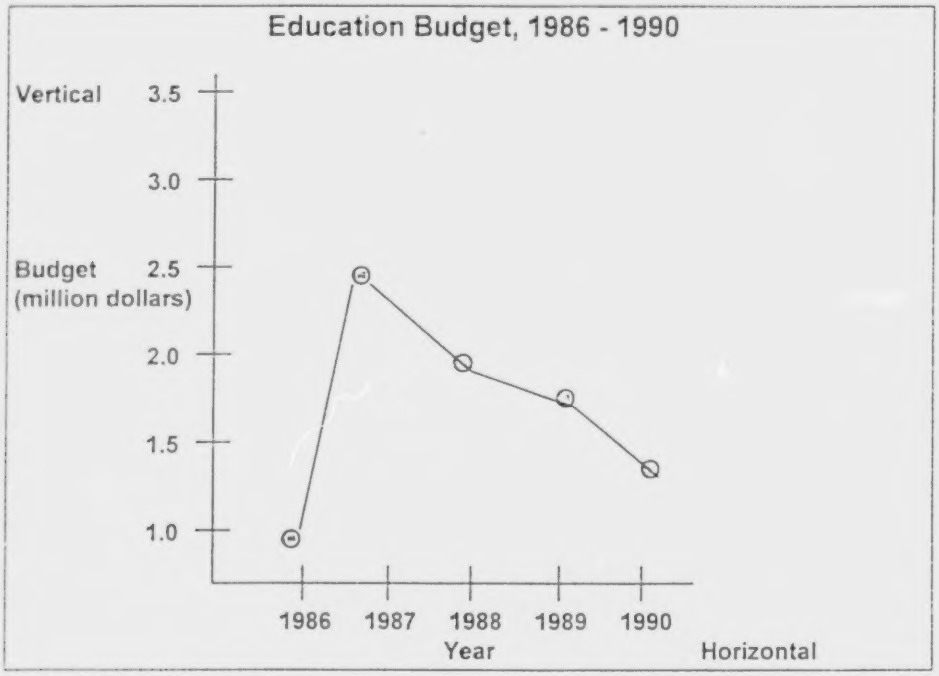
Activity 4 - Reading and Understanding Line Graphs

Objective(s): Participants will be able to

1. Read graphs using tips identified in the previous activity.
2. Practice reading line graphs.

You Need to Know:

Line graphs are easy to read. They present precise values. Line graphs have reference lines called axis. **The horizontal (side to side) line is called the x-axis. The vertical (up and down) line is called the y-axis.** Look at the graph below.



The horizontal axis that goes from left to right usually shows the units of time. The units may be hours or days, months, etc. Each mark on the scale stands for one unit of time. The vertical axis (up and down) shows the amount that is being measured. The amount may be dollars, pounds, or another kind of unit. Each mark stands for one unit.

The graph shows education budget for the years 1986 through 1990. Look at the horizontal axis (x-axis). What unit does each mark represent?

____

Each mark on the time axis represent one year. Each mark on the dollar axis represent a certain money amount: one-tenth of $1 million ($100,000).

To read the amount, you read the mark on the dollar axis that's directly across from the point. Then you read the mark on the time axis that is directly beneath the point.

Look at the point that is farthest to the left. What amount does it represent?

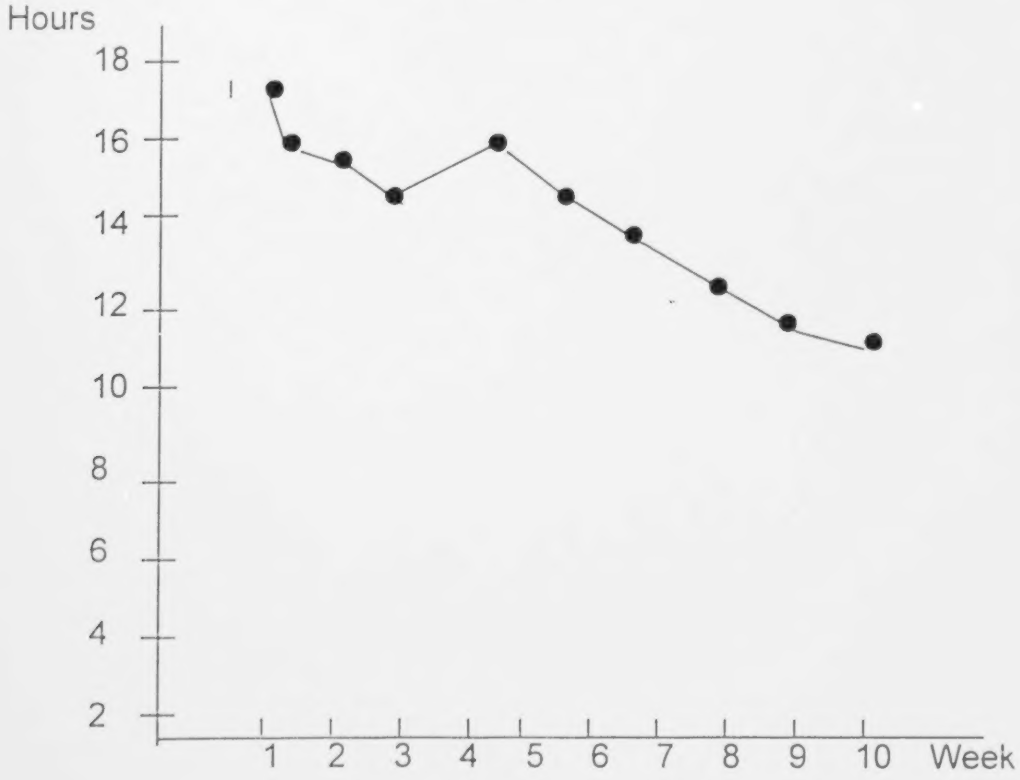
____

You would read the amount as $1.0 million in 1986.

Activity 4 - Understanding and Reading Line Graphs

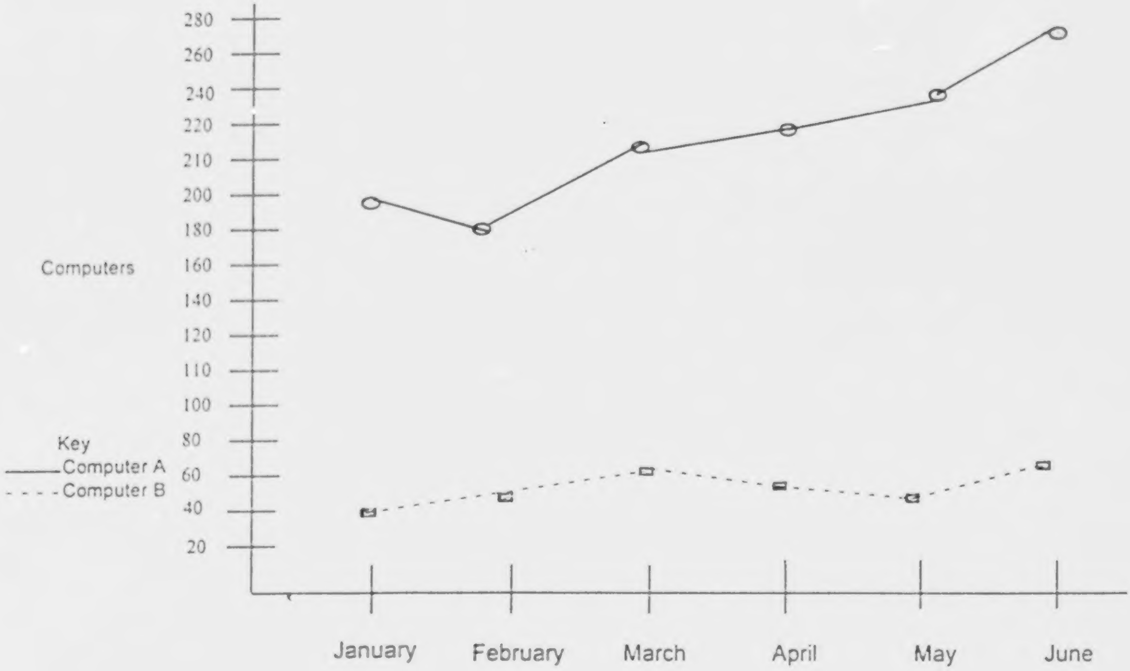
Line graphs can also be used to show how something has changed over a period of time. Data points (dots) are used to represent trends or relationships. Look at the example of the amount of down time recorded each week because of computer failure.

Computer Failure - Down Time



Sometimes a graph is used to show two or more different trends. These line graphs allow you to compare the changes in the trends during the same time period. A computer store may want to see how many of the two different brands of computers sold from January to June. Turn to the example on the next page.

Sales of Computers A and B, January - June



Look at the line graph. How do you know which line stands for computer A?____________________________.

The tips you learned in previous activities helped you understand that you should always notice the key (legend). Sometimes, a line may be identified by a label (word). Now identify the two lines above by writing ***Computer A*** or ***Computer B*** beside the right line on the graph.

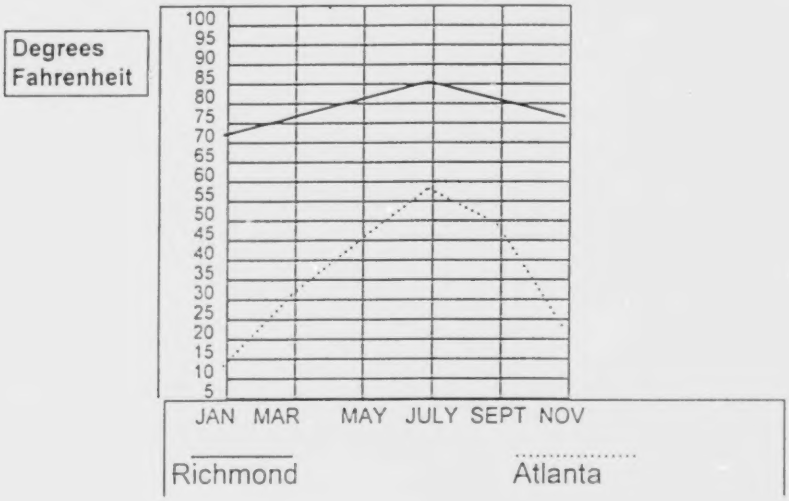
Activity 5 - Reading and Understanding Line Graphs

Objective(s): Participants will be able to

1. Read graphs using the tips identified in the previous activity.
2. Practice reading line graphs.

Directions:
Nabisco's bake shop employees are usually concerned about the weather because temperatures affect the baking process. Read the graph, and answer the questions.

Monthly Normal Temperatures



1. Which line represents Richmond?______________

2. How were you able to determine which line represented Richmond?______________________________

Activity 5 - Reading and Understanding Line Graphs, Continued

3. Which city, Richmond or Atlanta, has the greatest range of temperatures during the year?________________

4. During which month is there the least amount of difference between the temperatures of the two cities?_______________

5. During January, how much warmer is Richmond's average temperature than Atlanta? ______________

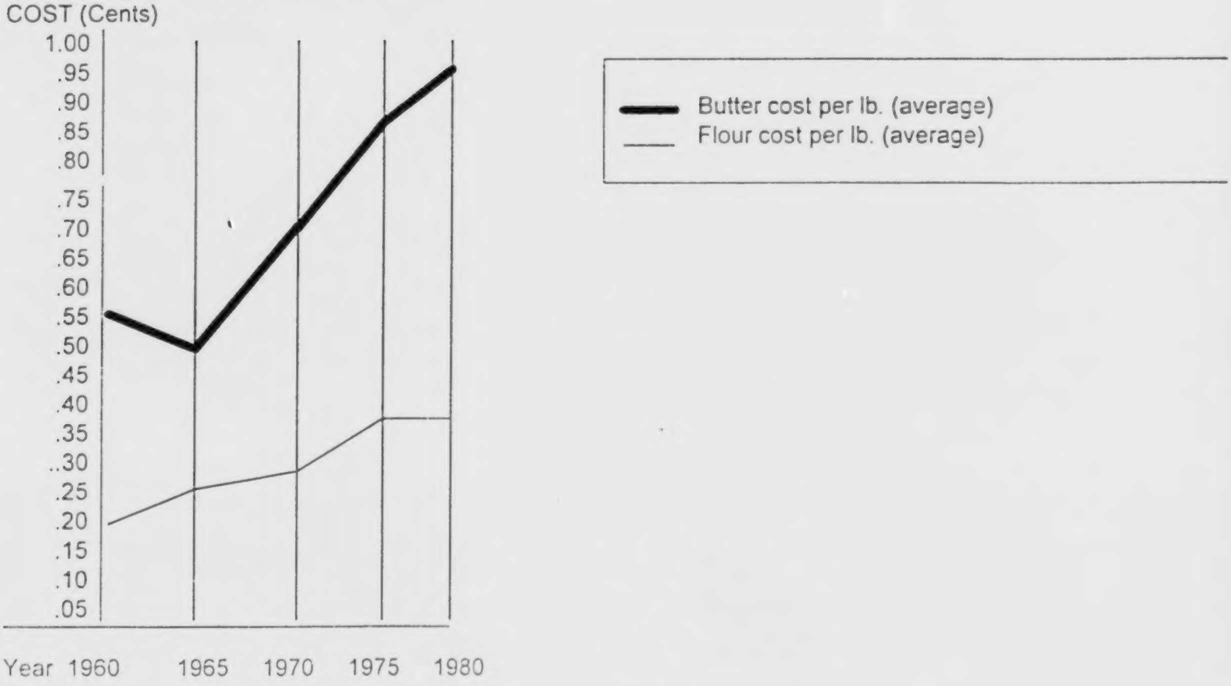
6. What relationship or comparison is being made here? *(Write your answer using a complete* sentence.) ____________________________

____

____

Directions: Read the line graph below. Answer the questions.

Price Trends for Butter and Flour



1. How much did a pound of flour cost in 1960?_____________

Activity 5 - Reading and Understanding Line Graphs, Continued

3. How much did a pound of butter cost in 1960?__________

4. Between which two years did the price of butter fall?
____

5. How much more did a pound of flour cost in 1980 than in 1960?
____

6. In 1980, how much more did a pound of butter cost than a pound of flour?_________________________

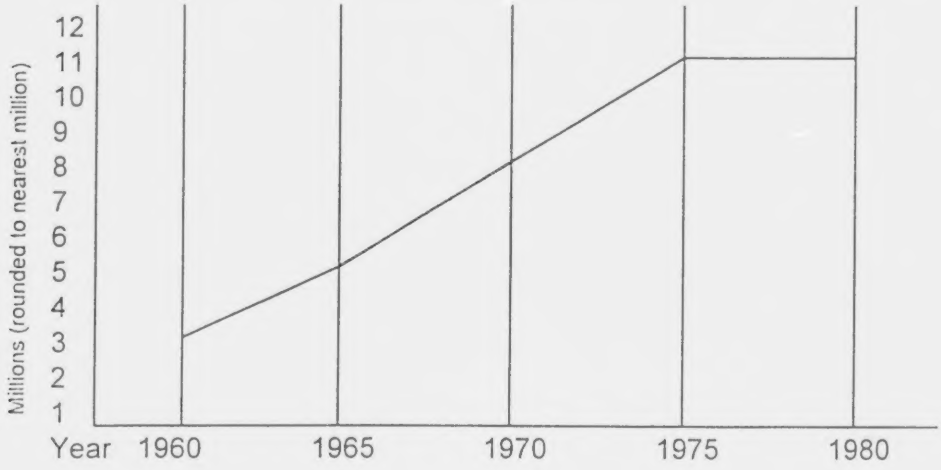
Activity 6 - Reading and Understanding Line Graphs

Objective(s): Participants will be able to

1. Practice reading line graphs.

Directions:
Read the line graphs below. Answer the questions.

Total Number of Crackers Purchased By Year



1, Does the graph show exact numbers or approximate numbers?

____

2. About how many crackers were purchased in 1970?

____

3. Between which years did the number of purchases level off?

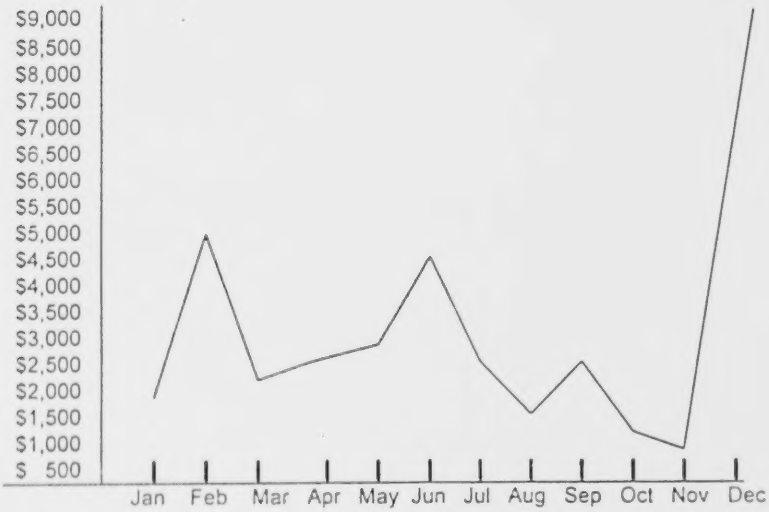
____

4. About how many more purchases were made in 1970 than in 1960?

____

Activity 6 - Reading and Understanding Line Graphs, Continued

1990 Monthly Sales of Animal Cookies



1. What is the subject of the line graph (write a complete sentence)?
____

2. What is the main point?____

3. In what month did the store make the fewest sales?_______________

4. In what month did the store make the greatest sales?_______________

5. What interesting conclusion can you draw about the great rise in animal cookies sales in December?______________________________
____

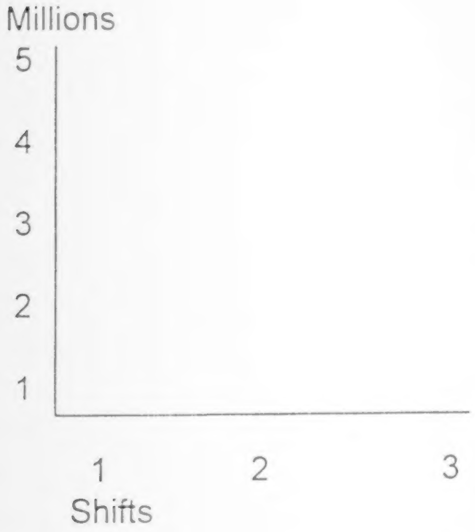
Activity 7 - Understanding Line Graphs in the Workplace

Objective(s): Participants will be able to

1. Read graphs using tips identified in the previous activity.
2. Practice reading line graphs.

Directions:
Read the line graph below. Answer the questions.

Premium Crackers Produced Per Shift



1. What is the unit of the y-axis?________________________________

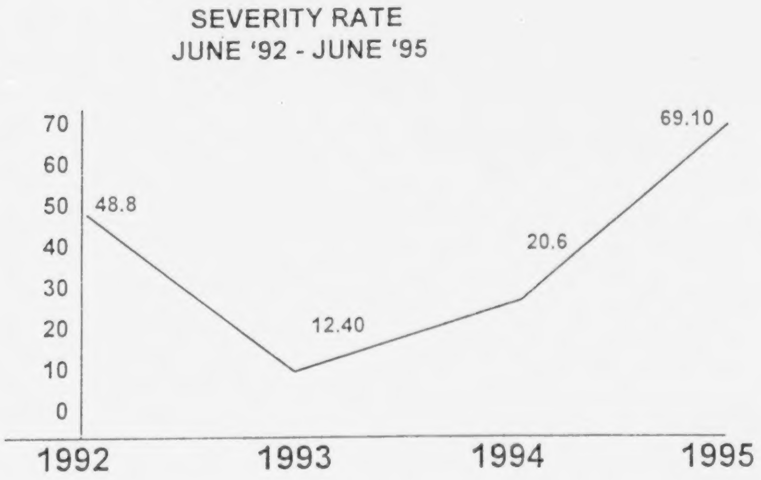
2. Plot the data points for each shift. The first one has been done for you (*Shift 1* - 1.0 million). *Shift 2* - 2.5 million; *Shift 3* - 4 million Now draw a line connecting the data points.

2. At what point were the fewest crackers produced?
____

3. What conclusion can be drawn from the graph about the production of crackers?________________________________.

Activity - 7 Understanding Line Graphs in the Workplace, Continued

Directions: The line graph below depicts the severity of accidents that have occured at a factory from June '92 through June '95. Read the line graph below. Answer the questions.



1. Based on the data how would you summarize the accident severity rate over the time period indicated?____________________

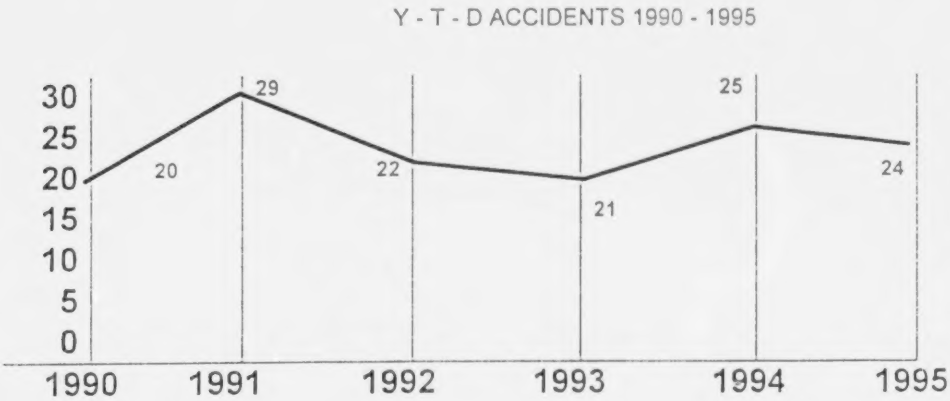
2. This line graph depicts the accident severity rate over what time period?____________________
____

3. Compare the serverity rate of 1992 to 1995. Is it increasing or decreasing?____________

4. What is the difference in the severity rate for 1995 and 1993?
____

Activity - 7 Understanding Line Graphs in the Workplace, Continued

Directions: The line graph below depicts the number of accidents that have occured at a company from 1990 and 1995. Read the line graph below. Answer the questions.



1. In what year was the highest number of accidents recorded?
   ____

2. In what year was the lowest number of accidents recorded?
   ____

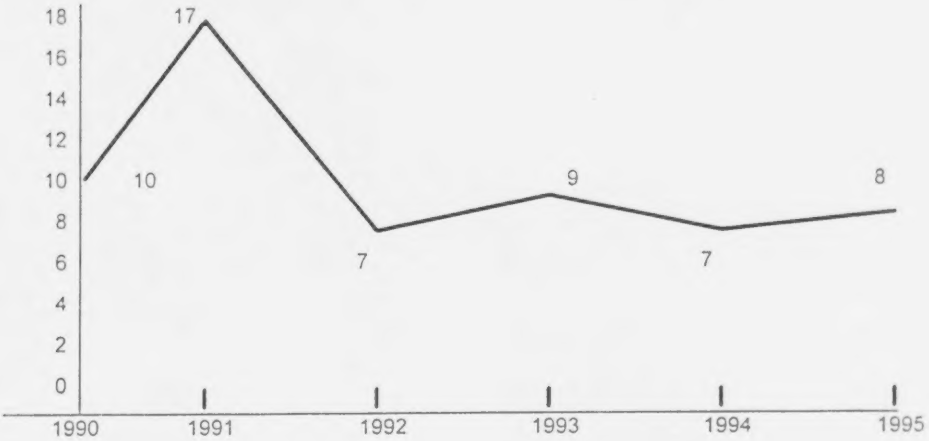
3. Between which years did the accident rate seem to almost level off?_________________________

4. What is the difference in number of accidents between 1992 and 1993, and 1994 and 1995? _____________________________

Activity - 7 Understanding Line Graphs in the Workplace, Continued

Directions: The line graph below depicts the amount of time lost due to accidents at a factory from 1990 and 1995. Read the line graph below. Answer the questions.

LOST TIME ACCIDENTS
Y - T - D 1990 - 1995



1. What year was recorded as having the largest amount of time lost due to accidents?______________________

2. What years were recorded as having the smallest amount of time lost due to accidents?

____

3. What conclusion can be drawn regarding the amount of lost time in 1991 and 1994?_________________________________

____

Activity - 8 Creating a Line Graph

Objective(s): Participants will be able to

1. Practice creating a line graph.

Materials Needed: Pencil, graph paper

Directions:
Use graph paper to create a line graph. Study the data presented below to determine what should be represented. Give the graph a title. You may refer back to the graphs in the previous activities.

Number of Oreos produced per day
1 million
1.5 million
2 million
2.5 million
3 million
3.5 million
4 million

5 days of production
Monday through Friday

Activity 9 - Reading and Understanding Bar Graphs

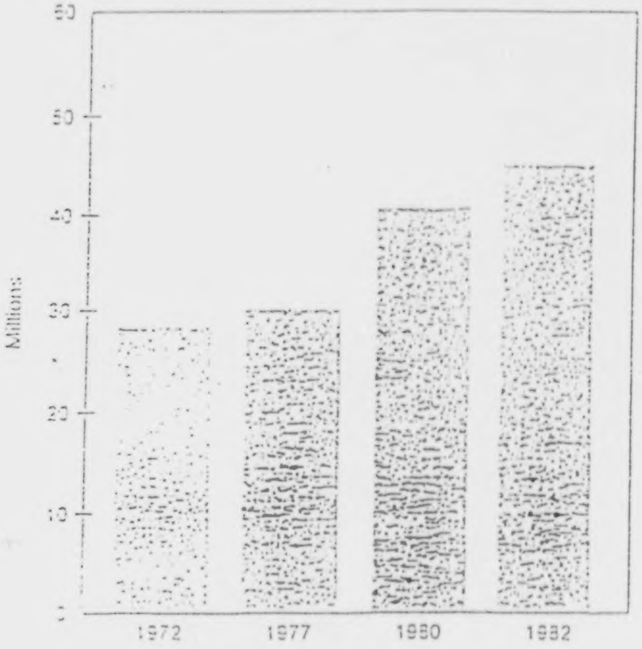
Objective(s): Participants will be able to

1. Practice reading bar graphs.

You Need to Know:
The same tips you used to read line graphs can be applied when reading bar graphs. If you need to review the tips, refer back to activities three and four.

Directions: Read the bar graph below. Answer the questions.

Employee Recreational Activities Attendance



1. This graph provides information for how many years?___________

2. Is the participation in recreational activities increasing or decreasing?__________

3. About how many more people participated in recreational activities in 1980 than in 1977?______

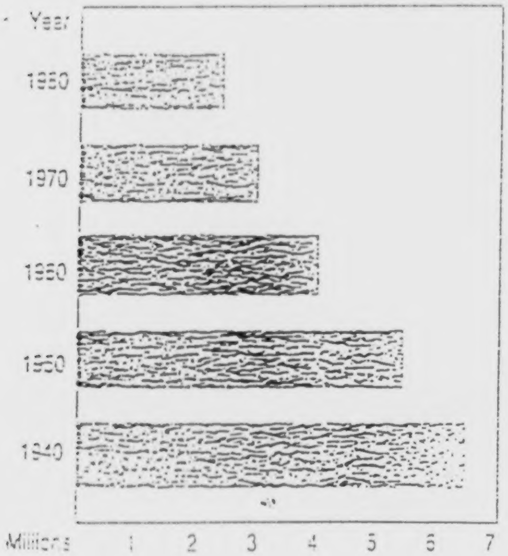
Activity 10 - Reading and Understanding Bar Graphs

Objective(s): Participants will be able to

1. Practice reading bar graphs.

Directions: Read the bar graph below. Answer the questions.

Number of Manufacturing Plants in the United States



1. Is this a vertical or horizontal bar graph?_________

2. About how many plants were there in the United States in 1960?

____

3. About how many more plants were there in 1940 than in 1980?

____

4. Based on the trend shown in the chart, would you expect there to be more or fewer plants by the year 1985? _________

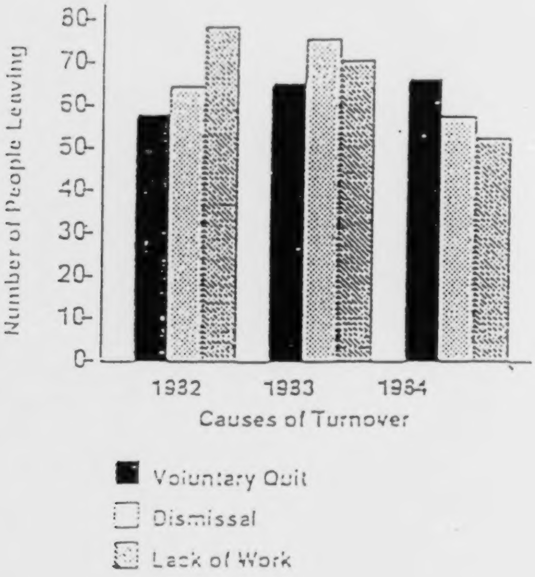
Activity 11 - Reading and Understanding Bar Graphs

Objective(s): Participants will be able to

1. Practice reading bar graphs.

Directions: Read the bar graph below. Answer the questions pertaining to it below. Circle true or false or write the answer in the blank.

Causes of Turnover at Company XYZ



1. Based on the data shown, in 1984 were there more dismissals than voluntary quits? T F

2. There were more dismissals in 1983 than in any other year? T F

3. Which year represented the least about of voluntary quits?________

4. What are the increments of increase on the y-axis?____________

5. What does the y-axis data represent?_________

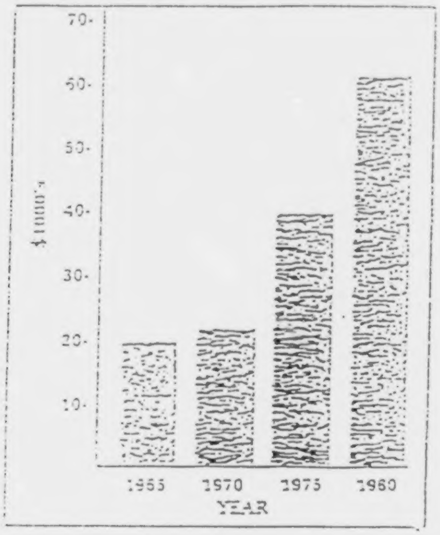
Activity 12 - Reading and Understanding Bar Graphs

Objective(s): Participants will be able to

1. Practice reading bar graphs.

Directions: Read the bar graph below. Answer the questions pertaining to it below.

Average Price of Roller Belts



1. Does this graph show exact numbers or approximate numbers?____________

2. What was the average price of a roller belt in 1965?

____

3. Between which years shown on the graph did the price of a the roller belt increase the least amount?_____________

4. About how much more did a roller belt cost in 1980 than in 1970?

____

5. Based on the graph, would you expect the price of roller belts to rise in the future?_____________________________

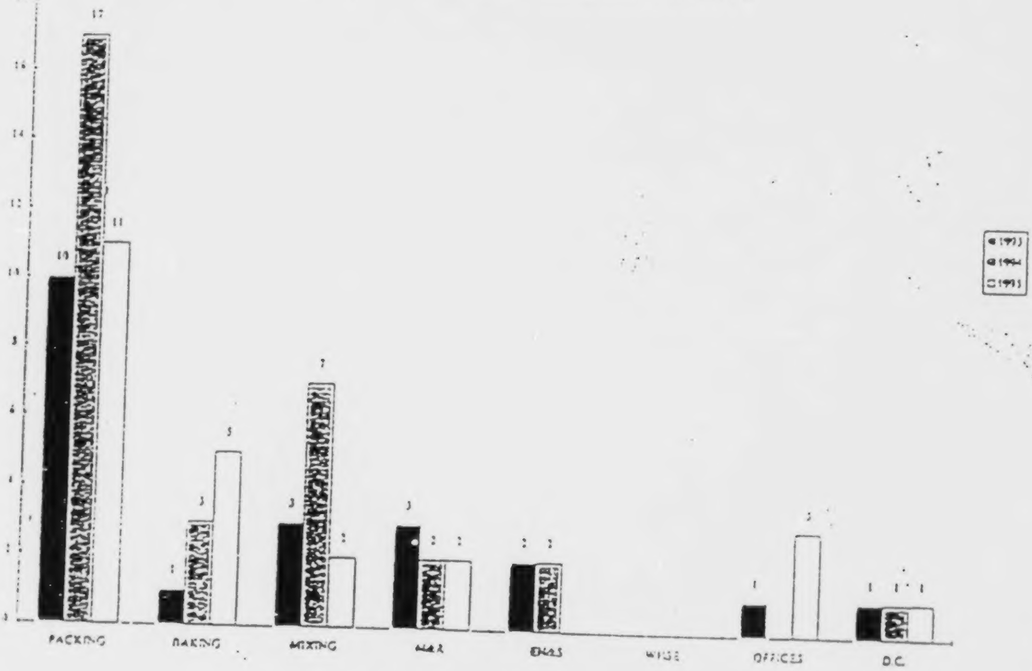
Activity 13 - Reading and Understanding Bar Graphs in the Workplace

Objective(s): Participants will be able to

1. Practice reading bar graphs.

Directions: Read the bar graph. Answer the questions.

ACCIDENTS BY DEPARTMENT



1. Which department had the lowest number of accidents in 1993?______________

2. Which department had the lowest number of accidents in 1994?__________

3. Which department recorded the most accidents over the three year period?___________

Activity 14 - Creating a Bar Graph

Objective(s): Participants will be able to

1. Practice creating a bar graph.

Materials Needed: Pencil, graph paper

You Need to Know:

Before attempting to create a bar graph, study the problem or question to determine what information is given for the values.

Determine the type of units should be shown on the x-axis. Do the same for the y-axis. If you need help, turn back to previous activities.

Directions:

Use graph paper to create a bar graph. Study the data presented below to determine what should be represented. Give the graph a title.

Number of students attending REACH from M&R, Packing, Mixing

Department	*Number of Students*
M&R	5
Packing	15
Mixing	3

Activity 15 - Reading and Understanding Pie Graphs (Charts)

Objective(s): Participants will be able to

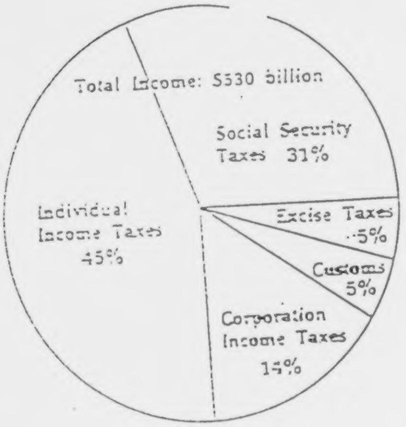
1. Practice reading pie graphs.

You Need to Know

Circle graphs show an entire quantity divided into various parts. Each part of the circle is called a segment or slice. Each segment has its own name and value. In most cases, values of circles graphs are parts of a dollar or percent of a whole (100%). They are usually used to show budget percentages. For example, the sources of each dollar that in the federal government budget.

Directions: Read the pie charts below. Answer the questions.

Government Spending



1. What is being presented in this graphic?____________________

2. The federal government received about 76% of its money from two sources. What are the two sources?____________________
____

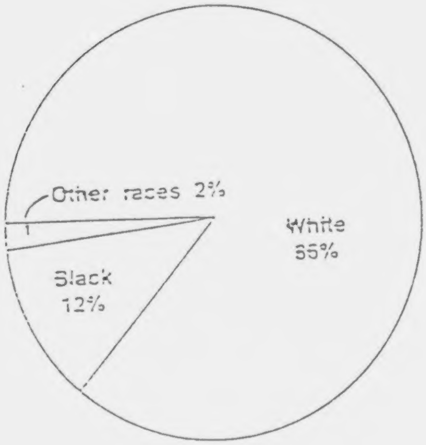
3 What percent of the government's income came from customs and excise taxes combined? ____________________

Activity 15 - Reading and Understanding Pie Graphs (Charts), Continued

4. About how much money did the government's receive from customs and excise taxes combined?__________________

5. What is being compared or the relationships of the numbers in this graphic?____

Population of Maine
Total Population: 6 Million



1. What is the total population of Maine?___________

2. What percent of Maine's population is white?_______

3. What percent of non-whites live in Maine? ________

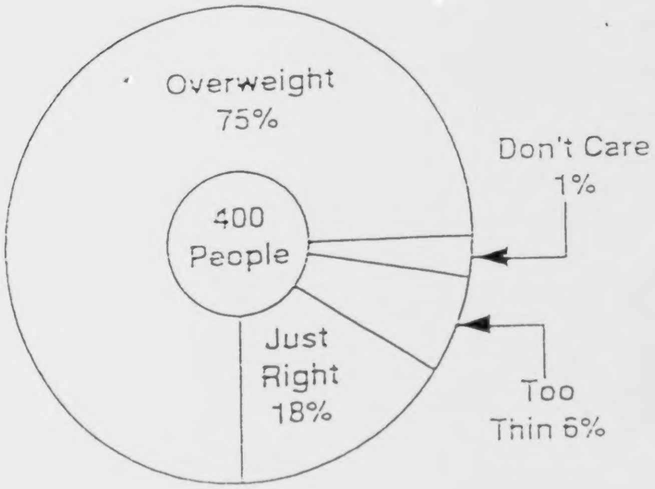
Activity 16 - Reading and Understanding Pie Graphs

Objective(s): Participants will be able to

1. Practice reading pie graphs.

Directions: Read the pie chart below. Answer the questions.

Survey of Feelings About Weight



1. How many categories of feelings are presented in the chart?_____

2. What percentage of people felt they were overweight?___________

3. What is the total number of people who participated in the survey?

____

4. More people felt they were "just the right size" than the overweight? (circle one) T or F

5. What percentage of people "didn't care" about the weight question?

____

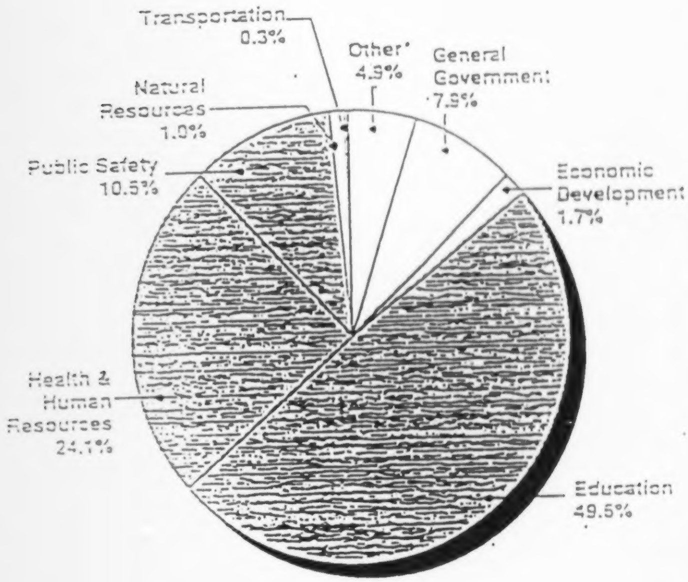
Activity 17 - Reading and Understanding Pie Graphs

Objective(s): Participants will be able to

1. Practice reading pie graphs.

Directions:
Read the pie chart below. Answer the questions.

Montana's General Fund Budget 1992



1. Most of the budget came from what three areas?
____________________, ____________________,
____

2. What is the combined percentage of the budget directed to Transportation and Natural Resources? ______________

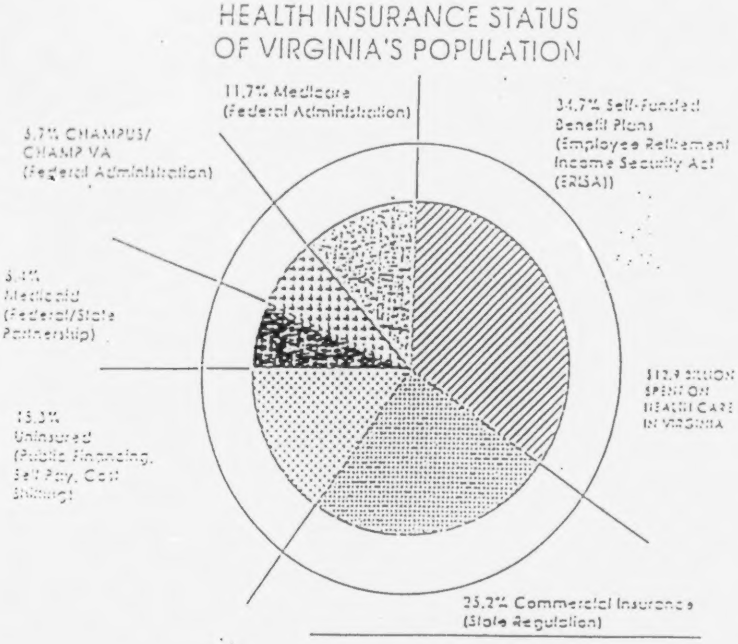
3. What slice of the pie presents the lowest percentage of the budget?
____

Activity 18 - Understanding Pie Graphs

Objective(s): Participants will be able to

1. Practice reading pie graphs.

Directions:
Read the pie chart below. Answer the questions.



1. How many Virginians were uninsured?_____________

2. How many Virginians receive Medicare?_____________

3. The majority of Virginians participate in self-funded benefit plans?
T or F

4. What is the combined percentage of Virginians that participate in Champus, Medicaid, and Medicare plans?_______

Activity 19 - Creating a Pie Graph

Objective(s): Participants will be able to

1. Use numerical data given to create a pie charts.

Materials Needed: Pencil, graph paper

Directions:
Below you will find figures on the number of people who purchased OREO cookies last year and the results of a NILLA's taste survey. Create pie charts using the figures. Use graph paper and don't forget to give the charts a title and label all slices.

Chart # 1
1977 Oreo Purchasers
25% people in age range of 20-25
45% in age range of 30-35
20% between ages of 40-45
10% Unknown

Chart #2
Nilla Wafers, Taste Survey
78% - Liked the taste with peanut butter
20% - Didn't like the taste with peanut butter
2% - No preference

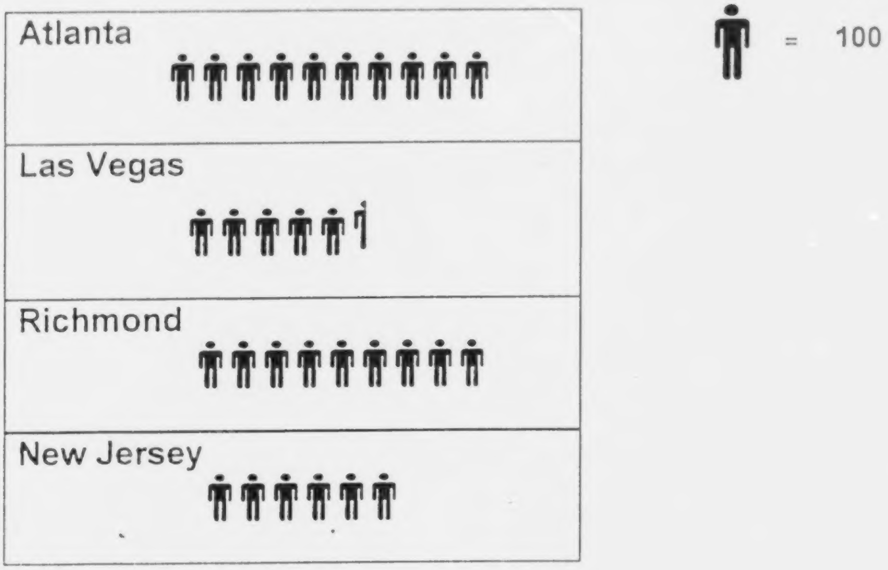
Activity 20 - Reading and Understanding a Pictograph

Objective(s): Participants will be able to

1. Practice reading a pictograph.

Directions: Read the pictograph below. Answer the questions.

Nabisco Facility Employee Population



1. What is being compared in this graphic?____________________

2. What type of graphic is represented?____________________

3. According to the graph, about how many people are employed by the Las Vegas facility?____

4. About how many people are employed by the New Jersey facility?____________________

5. How many people are employed by the Las Vegas, Richmond, and the Atlanta facilities combined? __________________

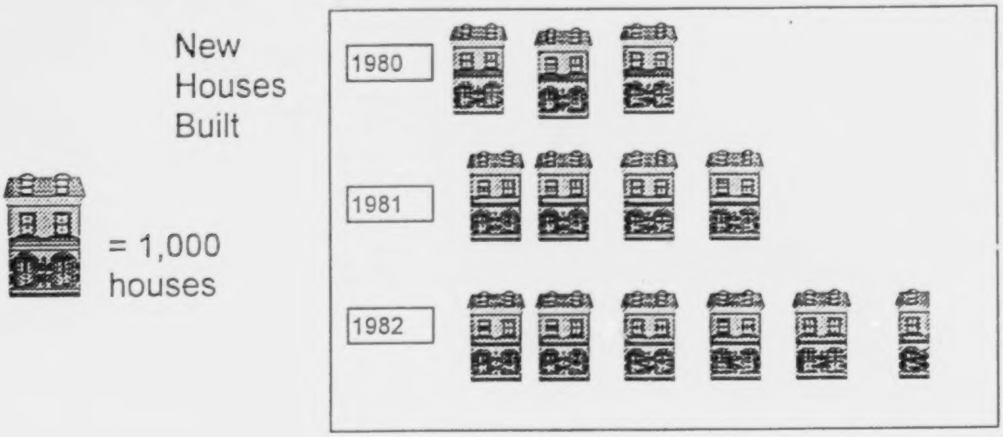
Activity 21 - Reading and Understanding a Pictograph

Objective(s): Participants will be able to

1. Practice reading a pictograph.

Directions: Read the pictograph. Answer the questions.

New Homes Built in James City



1. What is the value of one house on the graph?________

2. In 1980, about how many houses were built in James City?

    ____

3. Find the total number of houses built in James City for the years 1980, 1981, and 1982?

Activity 21 - Reading and Understanding a Pictograph, Continued

Average Yearly Cost of Tuition &
Fees at Public Colleges
$ = $200

1960	$ $ $ $
1965	$ $ $ $ $
1970	$ $ $ $ $ $
1975	$ $ $ $ $ $ $ $
1980	$ $ $ $ $ $ $ $ $ $

1. What was the average cost of tuition and fees for the year 1965?
   ____

2. Is the cost of tuition and fees increasing or decreasing?__________

3. How much more did tuition and fees cost in 1980 than in 1960?
   ____

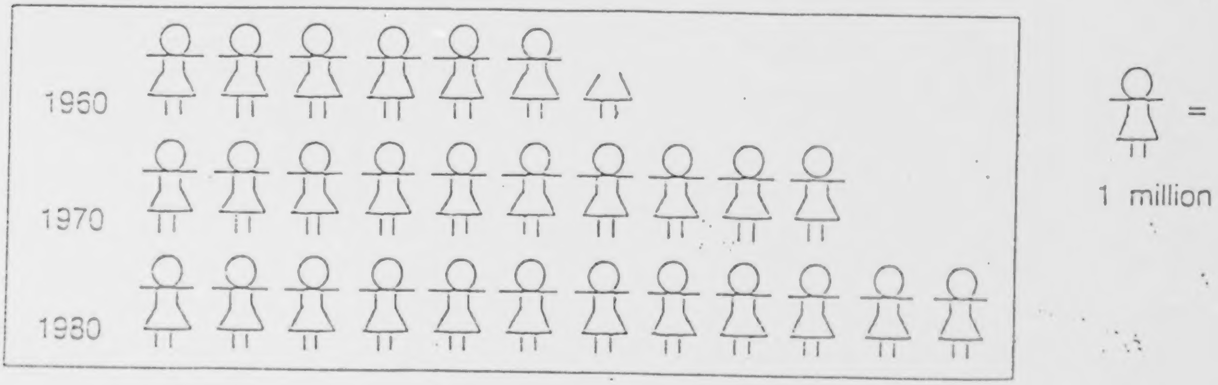
Activity 22 - Reading and Understanding a Pictograph

Objective(s): Participants will be able to

1. Practice reading a pictograph.

Directions: Read the pictograph. Answer the questions.

Working Women in the United States



1. If the trend shown in the graph continues, would you expect there to be more or fewer working women by the year 1985?___________

2. About how many working women were there in 1960?____________

3. About how many more working women were there in 1980 than in 1960?_________________

Activity 23 - Creating a Pictograph

Objective(s): Participants will be able to

1. Use numerical data to create a pictograph.

Materials Needed: Pencil, graph paper

You Need to know:
Determine what information needs to be represented. Consider what figure would best represent the information to be presented. Create a key (legend) to help readers understand what the values.

Directions:
Below you will find figures on the number of people who commute to work each day. Create a pictograph using a car as your symbol to represent the following numerical values.

Carpools by Van by Shifts
Shift 1 - 15
Shift 2- 10
Shift 3 - 4

Activity 24 - Understanding the Purpose of Charts

Objective (s): Participants will be able to

1. Become familiar with the purpose of charts
2. To identify different types of charts

Materials Needed: Pencil

You Need to Know:

Charts are used to organize information.

Charts are visual summaries of important steps or relationships. They may combine pictorial, symbolic, numeric, and or verbal elements.

Directions: Read the information about charts that follows.

Types of Charts Description & Purpose
Flow Chart Shows simple and complex sequences. Shows a process, organization, or functional relationship.
Tree Shows the way many things developed from one source. Also shows what has developed from the root to many branches.
Time Line Shows relations among events, cause and effect, sequence, multiple lines may be used to show overlapping events.

Comparison	Shows differences and similarities (compare and contrast, pros and cons, advantages and disadvantages. May be verbal or statistical.
Diagram	Shows structure of a system (a schematic), steps in a process. Classifies complex procedures.

Activity 25 - Learning how to read Charts

Objective (s): Participants will be able to

1. Become familiar with general tips used to read charts.
2. Practice using the tips to read charts.

Materials Needed: Pencil

You need to Know:

Here are some tips for reading charts:

1. Notice the title and type of chart. This will give you the main idea and purpose.

2. Notice symbols. Notice details. Observe relationships.

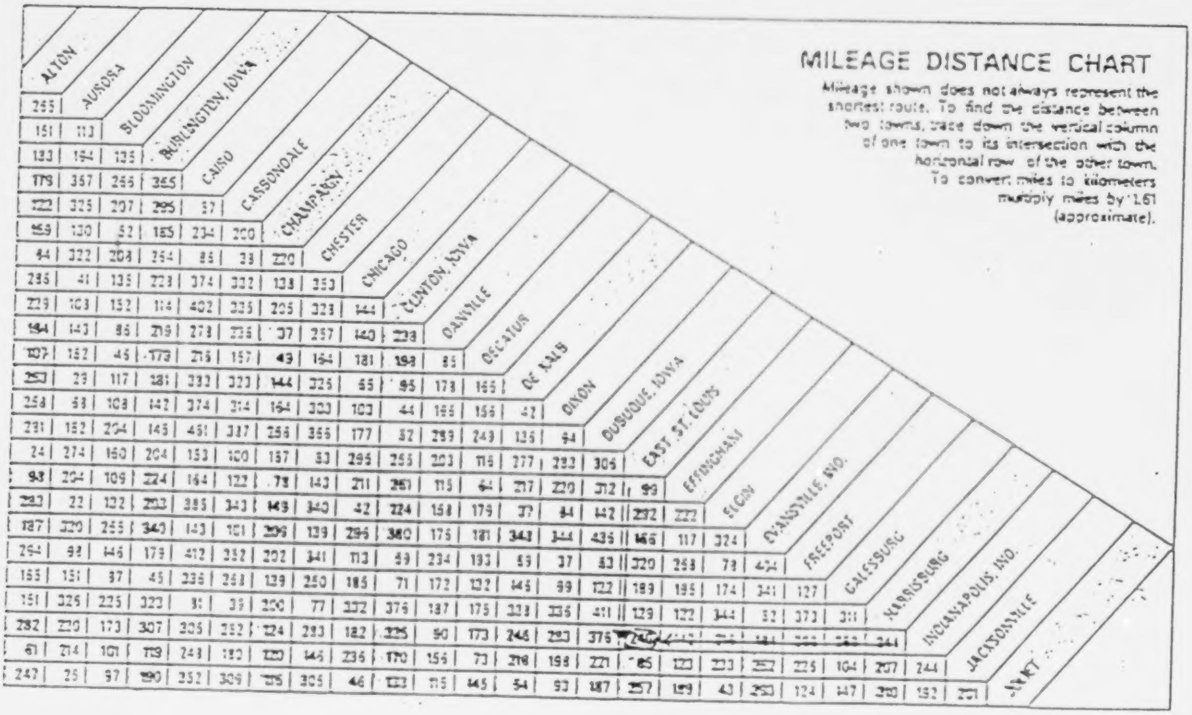
3. Notice the pattern of organization:
    - cause and effect
    - comparison/contrast
    - chronological order
    - classification
    - step-by-step procedure
    - system

4. Think about the data. Draw conclusions based on the data.

5. Read any text that is associated with the chart.

Now, let's look at a mileage chart on the next page.

Activity 25 - Learning How to Read Charts, Continued



MILEAGE DISTANCE CHART

Mileage shown does not always represent the shortest route. To find the distance between two towns, trace down the vertical column of one town to its intersection with the horizontal row of the other town. To convert miles to kilometers multiply miles by 1.61 (approximate).

	ALTON	AURORA	BLOOMINGTON	BURLINGTON, IOWA	CAIRO	CARBONDALE	CHAMPAIGN	CHESTER	CHICAGO	CLINTON, IOWA	DANVILLE	DECATUR	DE KALB	DIXON	DUBUQUE, IOWA	EAST ST. LOUIS	EFFINGHAM	ELGIN	EVANSVILLE, IND.	FREEPORT	GALESBURG	HARRISBURG	INDIANAPOLIS, IND.	JACKSONVILLE
AURORA	255																							
BLOOMINGTON	151	113																						
BURLINGTON, IOWA	133	194	135																					
CAIRO	179	357	256	365																				
CARBONDALE	222	325	207	295	57																			
CHAMPAIGN	159	130	52	185	234	200																		
CHESTER	84	322	204	254	85	33	220																	
CHICAGO	235	41	135	223	374	332	138	353																
CLINTON, IOWA	229	103	152	114	402	335	205	323	144															
DANVILLE	194	143	85	219	273	235	37	257	140	228														
DECATUR	107	152	45	173	215	157	43	164	181	193	85													
DE KALB	253	23	117	181	332	323	144	325	65	95	173	165												
DIXON	258	53	103	142	374	314	164	303	103	44	165	156	42											
DUBUQUE, IOWA	231	152	204	145	451	337	256	356	177	32	283	243	125	94										
EAST ST. LOUIS	24	274	160	204	153	100	157	53	295	255	203	115	277	232	306									
EFFINGHAM	93	204	109	224	164	122	78	143	211	261	115	64	217	220	312	99								
ELGIN	283	22	122	233	385	343	149	340	42	224	158	179	37	84	142	292	222							
EVANSVILLE, IND.	187	320	255	340	143	101	206	139	296	380	175	181	343	344	435	166	117	324						
FREEPORT	294	98	146	173	412	352	202	341	113	59	234	133	53	37	83	320	258	78	424					
GALESBURG	155	151	87	45	236	268	139	250	185	71	172	132	145	99	122	183	195	174	341	127				
HARRISBURG	151	326	225	323	[illegible]	39	200	77	332	376	187	175	323	336	411	129	122	344	52	373	311			
INDIANAPOLIS, IND.	282	220	173	307	305	252	124	283	182	325	90	173	246	293	376	240	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	244		
JACKSONVILLE	61	214	101	113	243	182	120	145	236	170	156	73	278	198	221	85	123	223	252	225	104	207	244	
JOLIET	247	25	97	190	252	309	125	305	46	133	115	145	54	93	187	257	159	43	250	124	147	290	132	221

A mileage distance chart shows how far it is from one city to another. The chart above shows the distance in miles between major cities and towns.

If you wanted to find the distance between East St. Louis, Illinois, and Indianapolis, Indiana. First trace down the column that says East St. Louis. Then find the row that says Indianapolis, Indiana. Trace across the row and find the point where the two cities intersect, or meet. That number is the miles between the two cities. Look at the chart, the 240 miles has been circled for you. Now use the chart to answer the questions below.

1. The distance from Burlington, Iowa, to Alton, Illinois, is______miles.
2. The distance from Decatur, Illinois to Champaign, Illinois is___miles.
3. The distance from Clinton Iowa, to East St. Louis,Illinois , is ___miles.

Activity 26 - Reading and Understanding Tables

Objective (s): Participants will be able to

1. Become familiar reading tables
2. Interpret data presented in tables

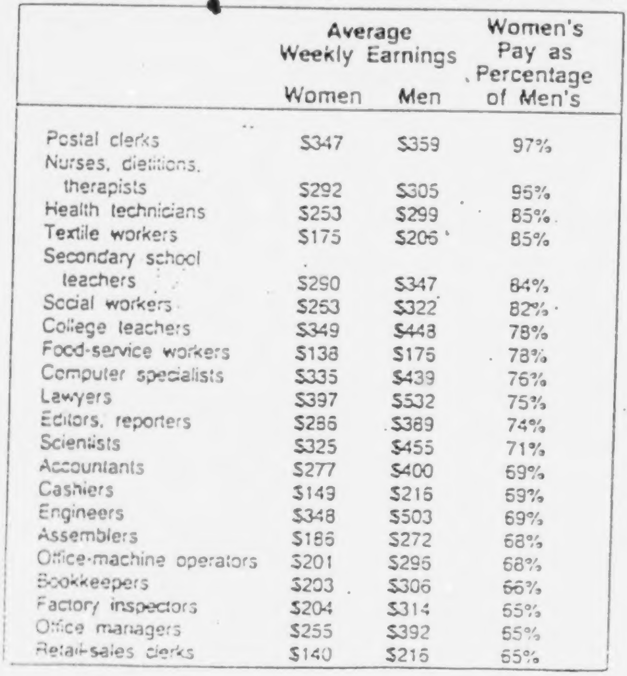
Material Needed: Pencil

You Need to Know:

When you want only certain facts, getting them for a table is usually much easier. A table has columns and rows of data. Columns are read up and down. Rows are read from side to side. A table may be as simple as two columns and two rows or it may be a complex as twenty columns and twenty rows of data. All of the data in a certain column is related in some way. Likewise, all of the data in a certain row is related in some way. Tables may include abbreviations or symbols and a key to explain what they mean.

Directions: Use the tables that follow to answer the questions.

Comparison of Weekly Earnings by Occupations



	Average Weekly Earnings		Women's Pay as Percentage of Men's
	Women	Men	
Postal clerks	$347	$359	97%
Nurses, dietitions, therapists	$292	$305	96%
Health technicians	$253	$299	85%
Textile workers	$175	$206	85%
Secondary school teachers	$290	$347	84%
Social workers	$253	$322	82%
College teachers	$349	$448	78%
Food-service workers	$138	$175	78%
Computer specialists	$335	$439	76%
Lawyers	$397	$532	75%
Editors, reporters	$286	$389	74%
Scientists	$325	$455	71%
Accountants	$277	$400	69%
Cashiers	$149	$216	69%
Engineers	$348	$503	69%
Assemblers	$186	$272	68%
Office-machine operators	$201	$295	68%
Bookkeepers	$203	$306	66%
Factory inspectors	$204	$314	65%
Office managers	$255	$392	65%
Retail-sales clerks	$140	$216	65%

1. According to the table, what is the average weekly pay for a woman computer specialist?______________________________

2. Of those listed, in how many occupations do women average more pay than men?_______________

3. On average how much more do men cashiers make per week than do do women cashiers?________________________

4. What type of comparison or relationship is presented in this graphic?____

Activity 26 - Reading and Understanding Tables, Continued

A Parent's Guide for Immunizations of Children

Immunization	Age (months)						
	2	4	6	12	15	18	60 (5 years)
Diphtheria	x	x	x			x	x
Whooping cough	x	x	x				
Tetanus	x	x	x			x	x
Polio	x	x	x			x	x
Measles					x		
German Measles					x		
Tuberculosis (TB) Test				x			

1. What is the subject of the table?
____

2. A parent brings in her six-month-old child for his immunization. What immunizations will the child receive?______________________

3. A parent brings in her 15-month old child for two immunizations. What are they?_____________________________

4. A parent has one-year old twins. She wants to know what they must take?____

Activity 27 - Reading and Understanding Tables in the Workplace

Objective(s): Participants will be able to

1. Become familiar reading tables.
2. Interpret data presented in tables.

Oven Profile - Oven C, May 5, 1992

TOP	ZONE	1	2	3	4	5	6	7	8
	TEMP	400	585	500	510	400	300	425	420
	PRES	10	20	22	19	20	18	5	7
	BURNERS	ON	ON	ON	ON	ON	ON	OFF	ON
BOTTOM	ZONE	1	2	3	4	5	6	7	8
	TEMP	300	500	525	425	375	370	350	300
	PRES	10	12	5	1	0	0	1	0
	BURNERS	ON	ON	ON	ON	ON	OFF	OPFF	OFF
	ZONE	1	2	3	4	5	6	7	8
	FANS	OFF	OFF	ON	ON	ON	OFF	ON	OFF
	DAMPERS	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED
	COMMENTS								

1. What is the temperature in zone 4 of the top portion of the oven?____

2. Are the burners on in Zone 1? (check one) Yes____ No____

3. How many zones are recorded on the table?________

Activity 28 - Reading and Understanding Graphic Measurements

Objective (s): Participants will be able to

1. Become familiar with graphic measurements
2. Practice reading graphic measurements

Material Needed: None

You Need to Know:

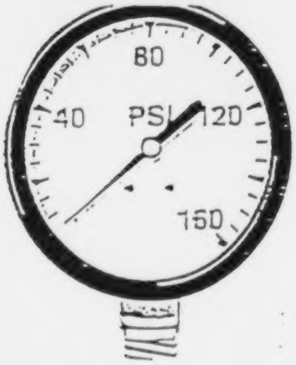
The Nabisco facilty has various graphic measurements that employees use to record data in order to monitor some part of the production process. For example, employees in the mixing department monitor the mixing process by checking the potentiometer read-out. Likewise, bake shop employees are constantly checking temperature gauges. They are also familiar with Scorpion Charts. (A Scorpian is a device that measures variation in temperature in different parts of an oven.)

A gauge is an instrument that measures pressure, temperature, and levels. One of the most common temperature gauges is the thermometer. Many people use a thermometer to measure heat and cold in ovens or refrigerators. Water heater installers use a thermometer test gauge when they are trying to find problems with a water heating system. If a house has a gas heater, it has a gas gauge that measures how much gas is used. There are also pressurized gauges, like gas, air, or water gauges. Pressurized gauges display the amount of pressure. However, they can also indicate high or low pressure.

Directions: Turn to the next page. Look at the different types of guages. Then move on to the next practice activity.

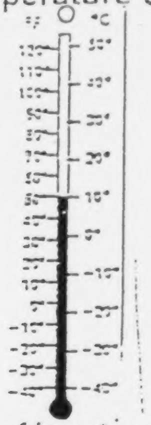
Activity 28 - Reading and Understanding Graphic Measurements, Continued

Pressure Gauge


80
40
PSI
120
160

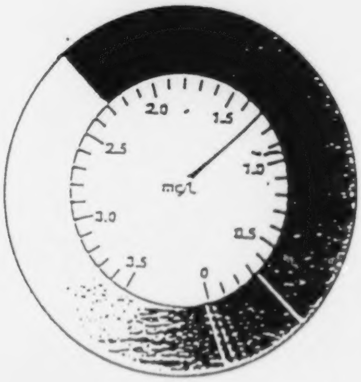
Shows a certain amount of pressure or level (e.g., gas,water, air gauges)

Temperature Gauge



Measures heat and cold in ovens or refrigerators (e.g., test gauge) for water heater.

Level Gauge


2.0
1.5
2.5
1.0
mg/L
3.0
0.5
3.5
0

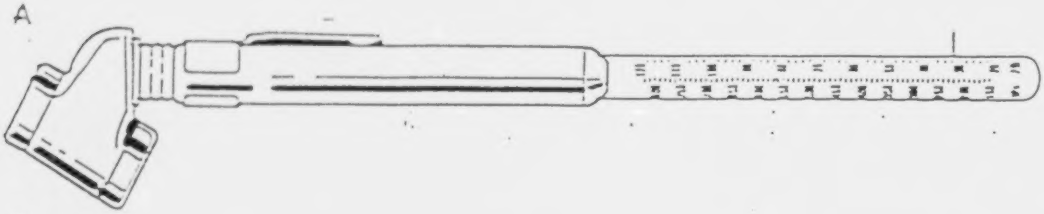
Measures levels and standards (e.g. level gauge).

Activity 28 - Reading and Understanding Graphic Measurements, Continued

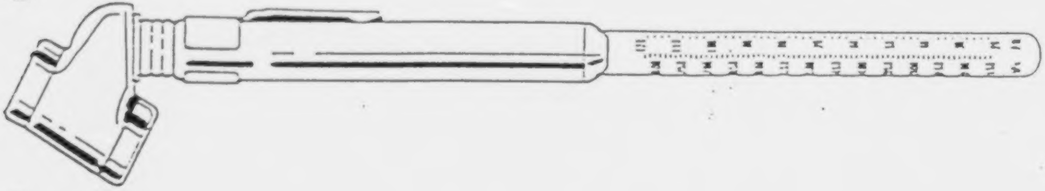
Let's look at the air pressure gauges below. Gauge A has a mark at the 32 psi unit. Using Guage A as your guide, place a mark at the correct air pressure for tires B and C.

Tire B: 40 pounds
Tire C: 110 pounds

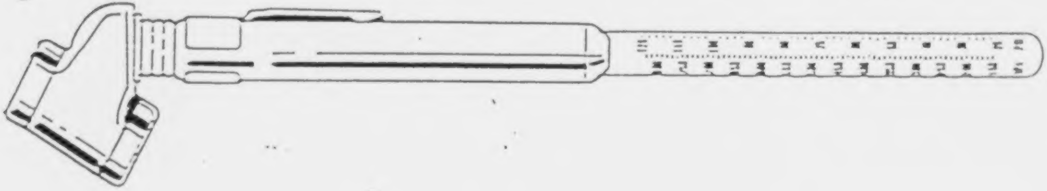
A



B



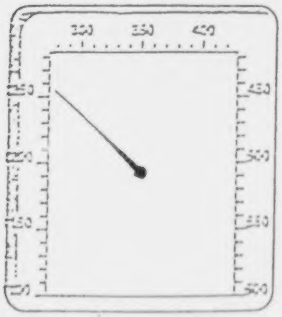
C



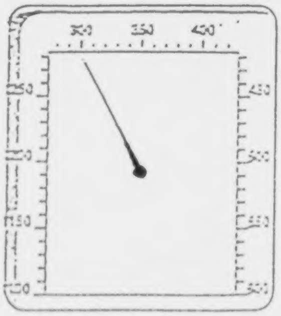
Activity 29 - Reading and Interpreting Thermometers

Thermometers measure temperature. Thermometers measure temperature in either Fahrenheit (F) or Celsius (C) readings. One common thermometer is a clinical thermometer. A clinical thermometer is used by doctors' offices, medical clinics, and hospitals. Clinical thermometers measure body temperature.

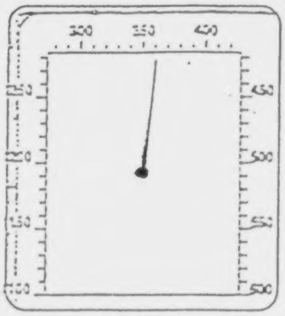
Directions: Now let's practice reading thermometers. Here is a baking scenario. The Nabisco bakery has been having problems with certain products baking properly. After five unacceptable batches, the employees to do a test to determine if the oven is malfunctioning. Read the temperature on each thermometer below. Then record the temperatures in the space provided.


300
350
400
250
200
150
100
450
500
550
600

A


300
350
400
250
200
150
100
450
500
550
600

B


300
350
400
250
200
150
100
450
500
550
600

C

Time	Thermostat Setting	Actual Temperature
1. 7:45 A.M.	A. 325°F	A.
2. 9:45 A.M.	B. 375°F	B.
3. 2:15 P.M.	C. 450°F	C.

Activity 30 - Reading and Interpreting Potentiometer

You Need to Know:
Potentiometer charts are used by employees in the Mixing Department. A Potentiometer is a gauge on the mixing machine that prints out a snapshot of what is happening as the dough is being made. This print out helps employees to analyze the texture of the dough. The texture of the dough is very important to the production process. This chart allows employees to determine the how tight or loose a dough may be. For example, the read-out may show a high resistance. The problem may be too much flour or too much water.

A sample of a cookie dough guideline is attached. The chart shows three stages of the process. In the Cream-Up stage the sugar and oils are being mixed at the start of the process. The second stage is the Shortening Cream-Up is all liquid, oils are mixed. Then the flour is mixed in the dough mix stage.

When the reading the chart, the vertical (up and down lines) is a representation of the time the dough has been mixing. The horizontal lines is a representation of the resistance of the dough. If the resistance is charted above or below the control limits, a supervisor is called. In the case some products, a dough with soft resistance is more acceptable. Employees monitor charts on the mixer at regular intervals.

Directions: Now you know how a Potentiometer Charts is used in the Mixing Department. Now think of other charts or tables you use on the job. Write the name of the chart and its use in the spaces provided.

Chart Name *Chart is used to...*

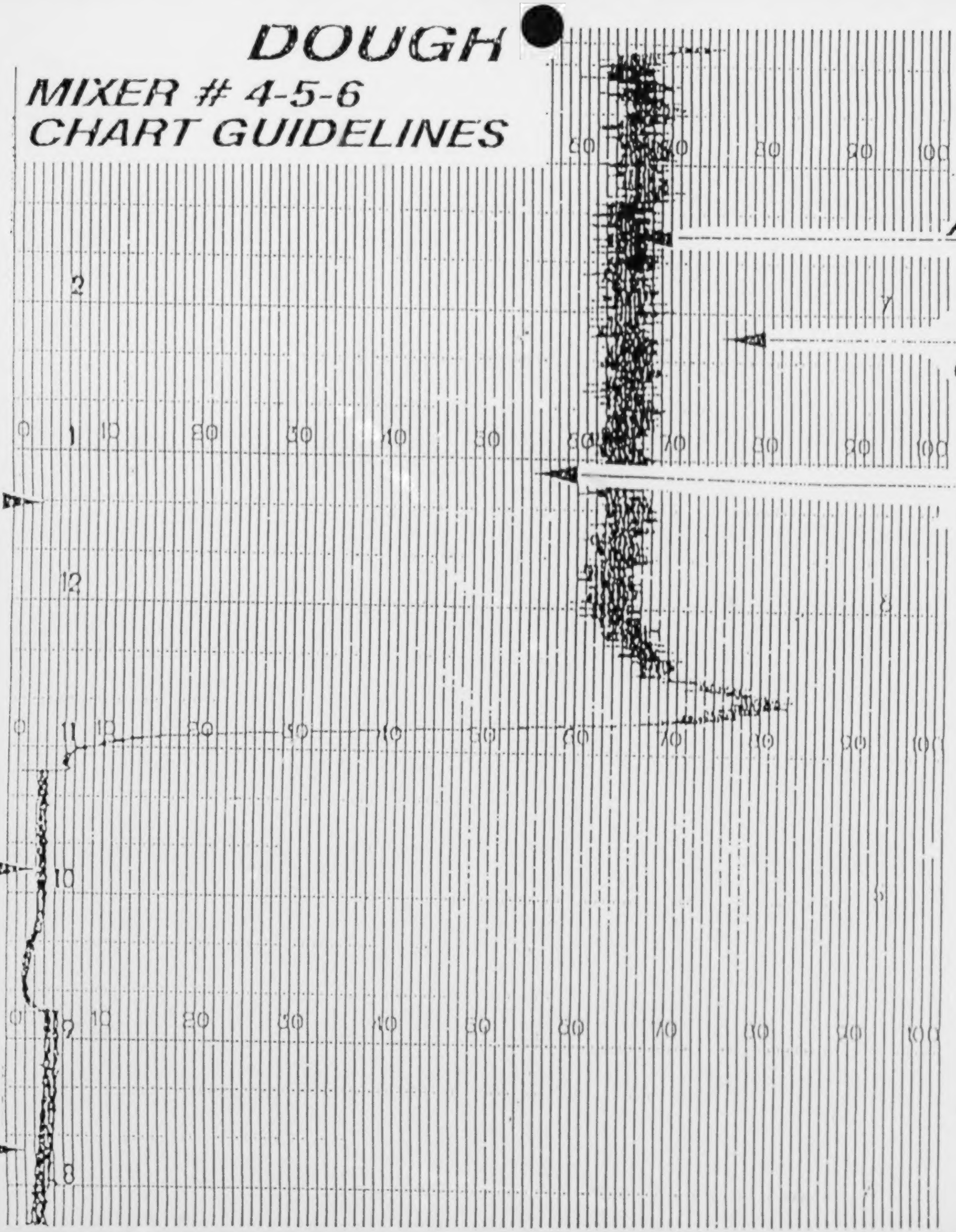
________________ ________________________________

________________ ________________________________

________________ ________________________________

DOUGH

MIXER # 4-5-6
CHART GUIDELINES



AIM POINT 65

UCL LIMITS 75
CALL SUPERVISOR

DOUGH MIX

LCL LIMITS 55
CALL SUPERVISOR

SHORTENING
CREAM UP

CREAM UP

USING MEAL

Activity 31 - Understanding the Purpose of Control

1. Interpret data using charts and make decisions based on the data.
3. Plot data points on charts.

Materials Needed: Pencil, Attached handout of decision rules

You Need to Know:

Nabisco employees have to make decisions on a daily basis about improving their work processes. They do this by using Process Operating Guidelines (POG). They use control charts to collect facts and data. Then they decide what should be changed to improve the quality of the product. Data collection is very important because it helps employees identify the causes of problems and monitor the production process.

What kind of problems might occur during the production process? The list of possibilities is great. However, a few are listed below:

- dough temperature out of control
- dry weights out of control
- stack heights out of control

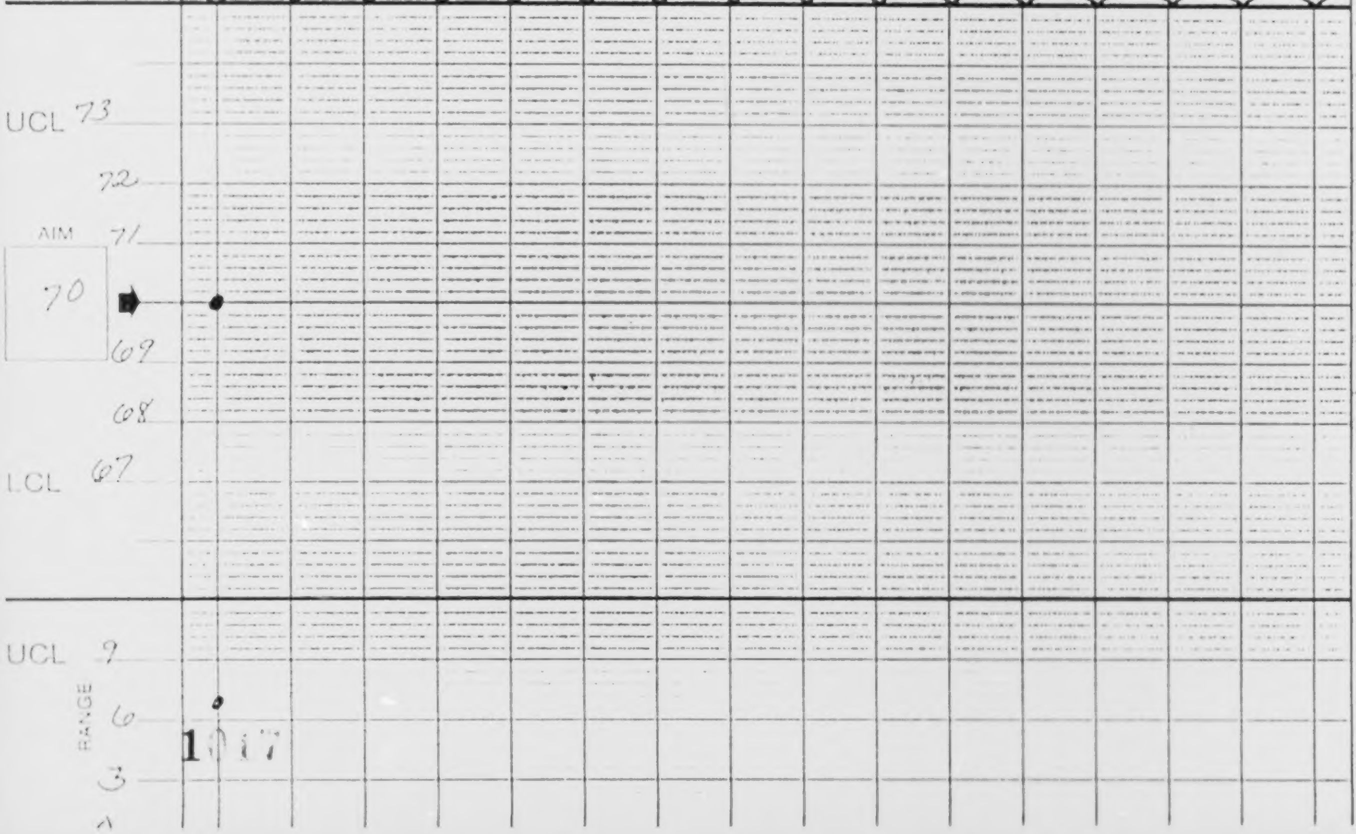
In order to get a handle on what temperatures are acceptable for the doughs, an employee will take samples of dough at particular times during a shift. The data collected is plotted on a control chart manually or by computer. Once the data is collected, employees use standard decision rules to make decisions about the production process. In this activity, you will plot data manually and learn to read a computer generated chart.

Directions: Look at the sections of a control chart that are outlined on the attached pages. You will be guided through the process of manually completing a control chart.

CONTROL CHART NB-5260-E

DATE	PRODUCT	SHIFT	ATTRIBUTE	LINE NO.	OPER
9/16/95	#019	2	Wet Weights	1	Denner #14962

TIME		3:30	4:00	4:30	5:00	5:35	6:00	6:25	7:00	7:30	8:00	8:30	9:00	9:30	10:00	10:30	11:00
ANALYSIS E	1	74	72	69	70	72	76	76	70	73	71	68	75	71	70	70	74
M	2	69	69	72	74	71	75	72	74	70	75	69	74	72	75	69	67
W	3	67	65	68	65	68	65	67	66	70	66	73	64	67	64	67	69
	4																
	5																
	6																
SUM	Σ	210															
AVERAGE	X̄	70															
RANGE	R	7															



ASSIGNABLE CAUSE LOG

ACTION	CAUSE

DECISION RULES

1	IN RED
2 OF 3	IN YELLOW (ALL ON SAME SIDE OF AIM)
5	IN A ROW (ALL ON SAME SIDE OF AIM)
5	IN A ROW IN AN UPWARD OR DOWNWARD TREND (BETWEEN CONTROL LIMITS)

INVESTIGATE/REACT/DOCUMENT

Directions Continued: The top part of the control chart includes the following: the date (September 15, 1995) , product name (Product #019), shift number (2) , the type of data being collected (attribute), production line number (1), and the operator's name (Denner).

In this case, wet weights are being monitored for Product #019. Denner collects data or samples every half-hour, starting at 3:30 p.m. His samples are collected from three conveyor belt areas, the East, Middle, and West. Reading down the row, under the 3:30 p.m., his weights were 74, 69, and 67. He does the same procedure for the rest of the samples. Look at the times the samples were taken. Did he take all samples on time?
Yes___ No___

After taking the samples, Denner computed an average of the samples. for example, at 3:30 p.m., he added 74+69+67=210. Then he divided 210 by 3 to get an average of 70. After obtaining his average, Denner computed the range by subtracting the highest number from the lowest, 74-67 = 7. Now help Denner out by computing the average and range of the rest of the samples. Use the exact numbers, do not round off.

Denner knows that the target (aim) weight is 70. The aim is also called the control limit. If all weights were hitting the aim, then he has a really good control of the process. However, some variation is expected in the process, but within acceptable limits. The Upper Control Limit is 72, meaning no weights should average above this limit. The Lower Control Limit is 67, so no average should weigh less than 67. Ideally, the points plotted, representing the collected data, should fall randomly between the upper and lower control limits, fluctuating above, below, and on the aim or target line. Therefore, Denner continues to monitor his process by plotting the data points to determine how his process is running.

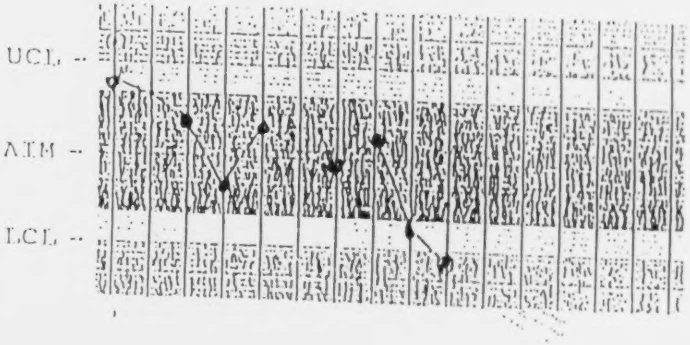
Let's help Denner out by plotting the average and range of the wet weights. The first five have been plotted for you. After plotting the points, draw lines to connect the data points (dots). Look at the results. Denner would analyze the results and apply decision rules when necessary.

DECISION RULES

As you monitor the process, watch for these examples. If any of the examples below occur on your control chart, investigate immediately and take action if necessary.

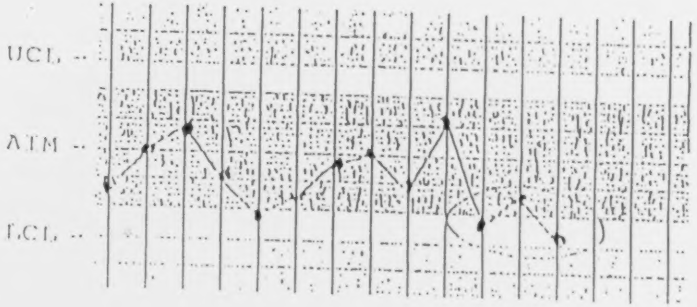
1. POINT BEYOND UPPER OR LOWER CONTROL LIMIT

When a point is plotted above the upper control limit, or below the lower control limit, adjust the process immediately. Take a recheck and continue this procedure until point is within the acceptable limits. Plot all checks.



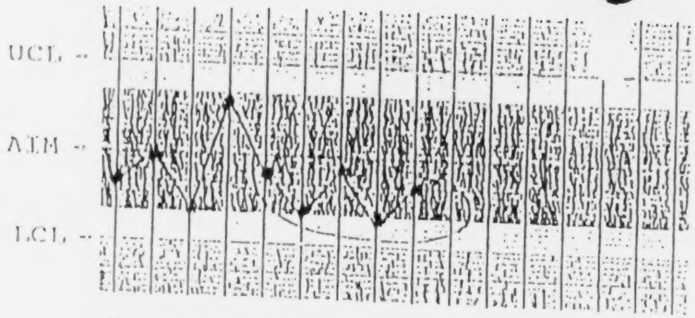
2. 2 OUT OF 3 POINTS IN YELLOW

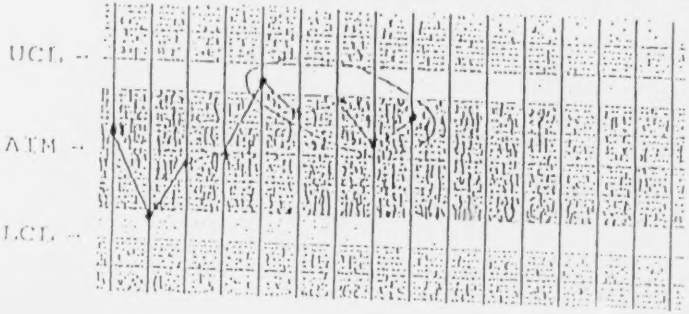
When 2 points out of 3 fall in the yellow, on the same side of the aim line, a shift may be forming. Check for possible causes and notify your supervisor. Make adjustments if instructed. Take a recheck if any adjustment is made and continue this process until the points fall nearer the aim.



3. SHIFT OR RUN

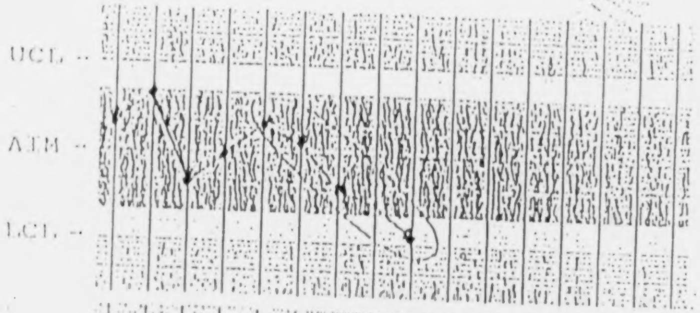
When 5 or more points in a row are plotted between the aim line and either the upper or lower control limits, adjust the process and recheck immediately. Check for any changes such as in temperatures, raw materials, or parts wearing out. Continue to monitor the process making adjustments and rechecks to ensure the shift has been corrected.

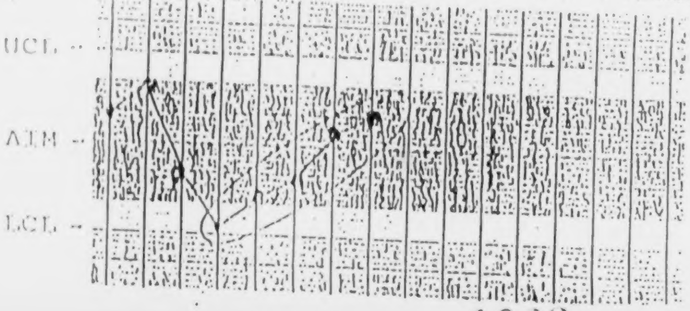




4. TREND

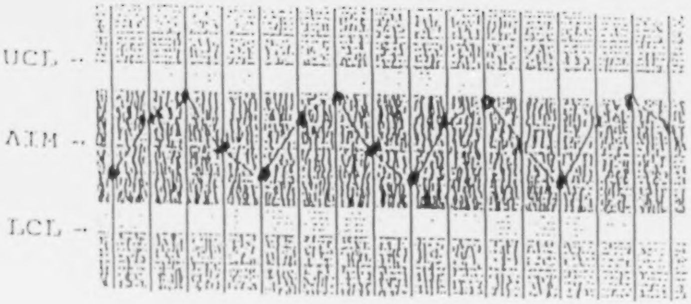
A trend is forming when 5 or more plotted points in a row form an upward or downward pattern between the upper and lower control limits. The trend may cross the aim line. If this happens, notify your supervisor.





5. PERIODICITY

When the points you have plotted form a repeating pattern, notify your supervisor.



The decision rules are summarized on the bottom right corner of the control chart. After reading about the decisions, summarize in the blanks below, what decision should be made about this process.

Summary of Decision____

____

____

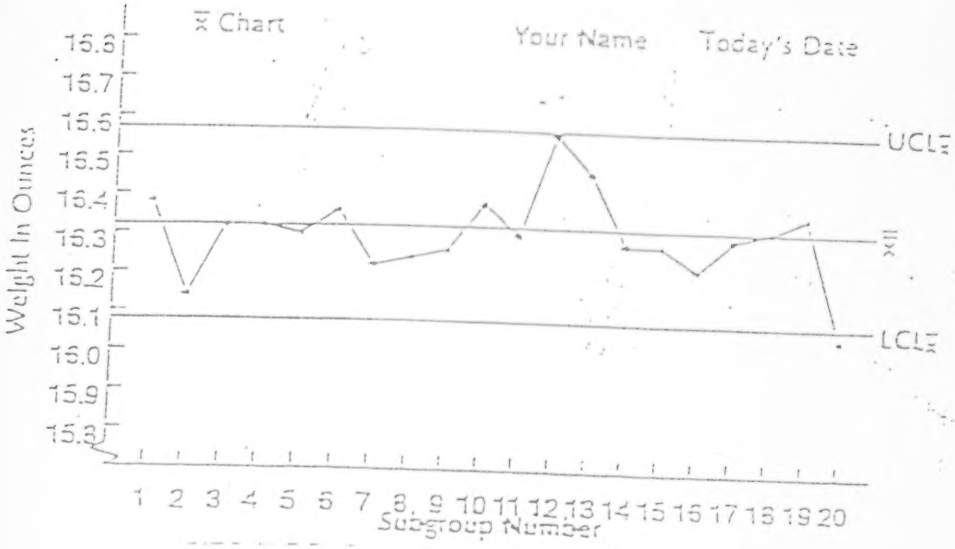
____

Activity 31, Continued

Directions: Use the decision rule handout to determine which rule each of the example charts represent.

Chart #1- Decision Rule______________________________

Wheat Thins - 16 oz.
Shift 3, Line 7



Line: Oreo

Chart #2 - Decision Rule______________________________

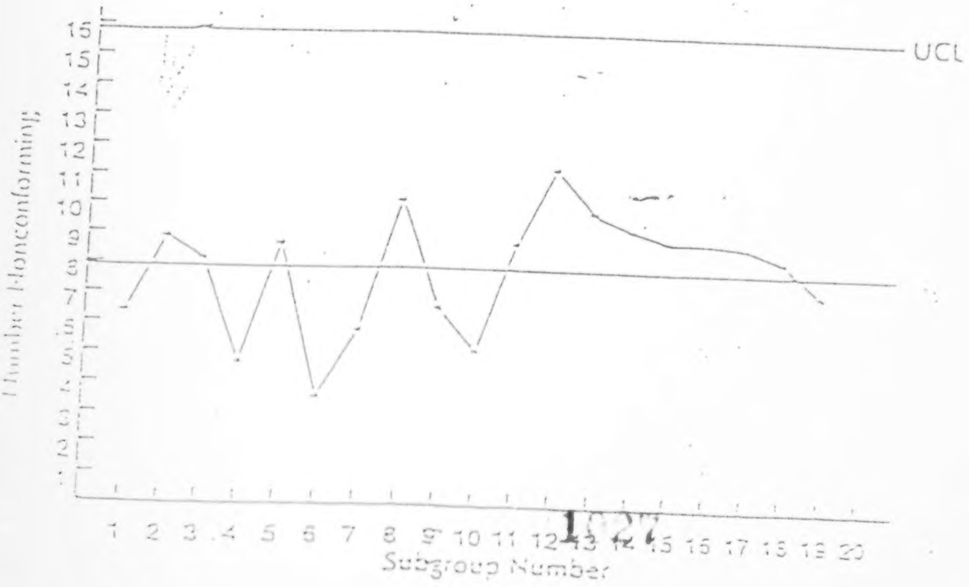
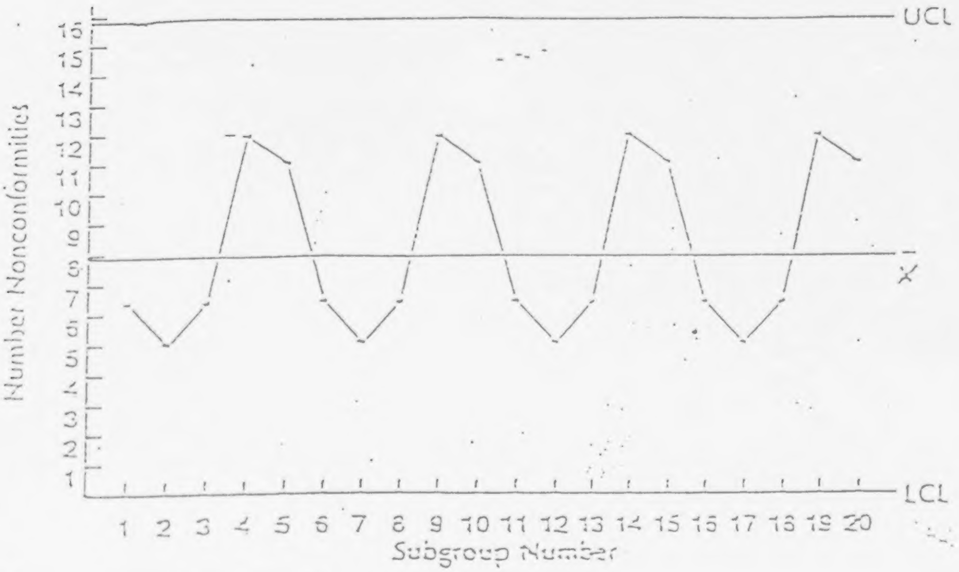


Chart #3 - Decision Rule________________________

Line: Chips Ahoy!



Activity 31 - Understanding and Using Control Charts

Material Needed: Blank Control Chart

Directions: Plot the range on a blank control chart for the following scenario. You are making Cheese Nips and the weight samples are ranging between .5 and 1.5. The lower control limit for range is 0. The upper control limit for this chart is 2. Plot the ranges below on the control chart.

.5
.7
.8
.1
1.0
1.5
1.2
.9
1.5
.6
.6
.5
1.5
.4
1.3
1.4

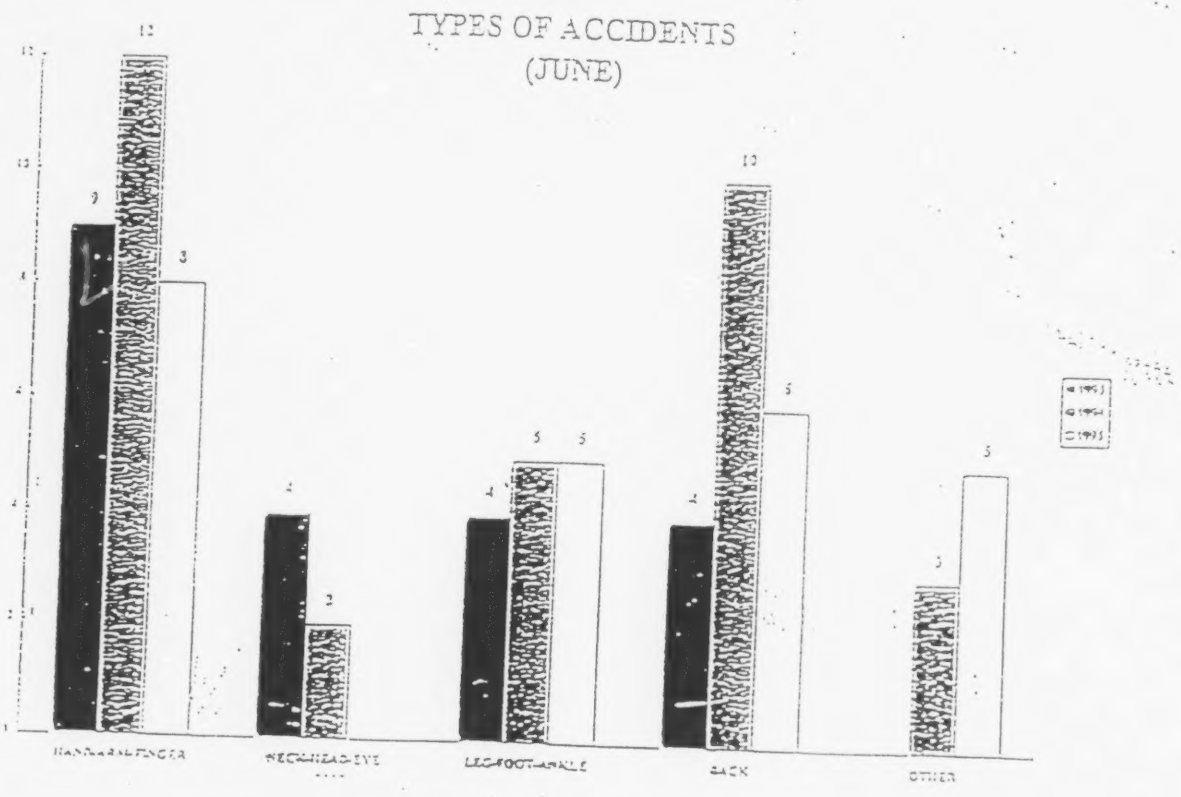
Activity 32 - Using Graphs & Charts in the Workplace Review

Objective (s): Participants will be able to

1. Understand trends relationships and decision making.

Material Needed: Pencil

Directions: Read the graphs and charts below. Use the tips you've learned in this module to answer the questions.



1. What is the title of this graph?______________________________

2. What type of data is represented on the x-axis?________________

3. What type of units are represented on the y-axis?______________

4. Is this a vertical graph? Yes____ No____

5. In what two years were the leg-foot-ankle accidents the same?
____

6. What conclusion can you draw about the graph regarding the number of accidents that have occurred in June of 1994?________________

7. Compare the number of back accidents over the three year period?
____

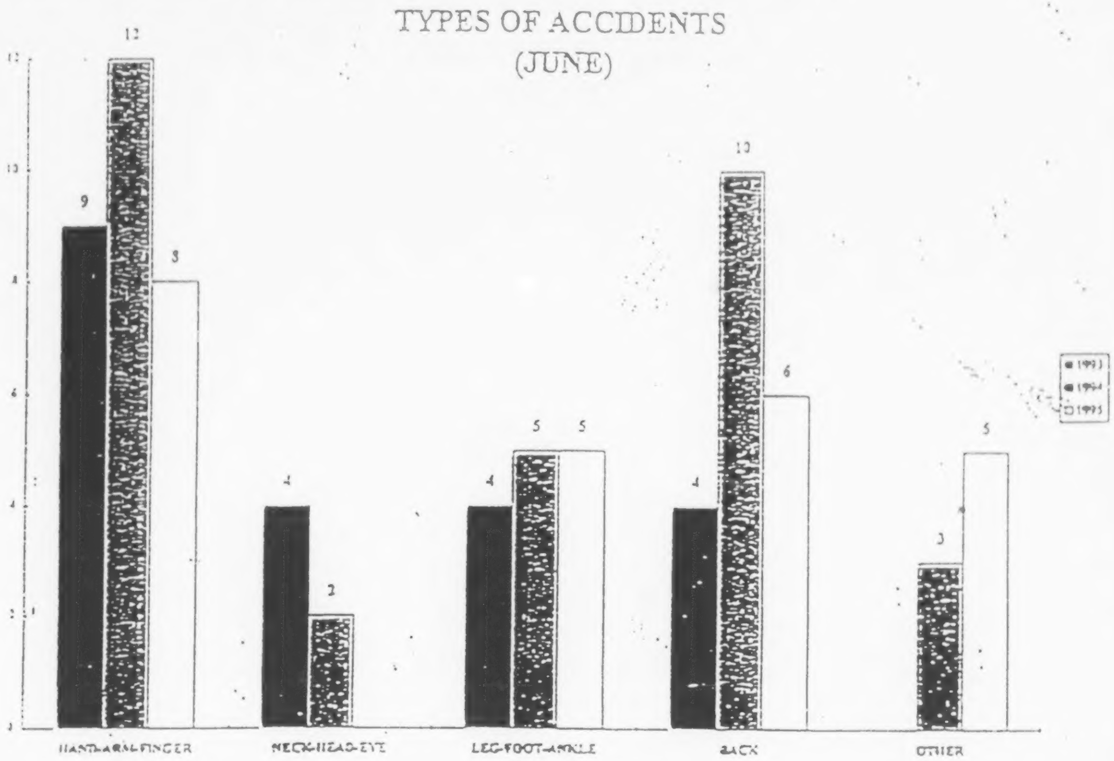
Activity 32 - Using Graphs & Charts in the Workplace Review

Objective (s): Participants will be able to

1. Understand trends relationships and decision making.

Material Needed: Pencil

Directions: Read the graphs and charts below. Use the tips you've learned in this module to answer the questions.

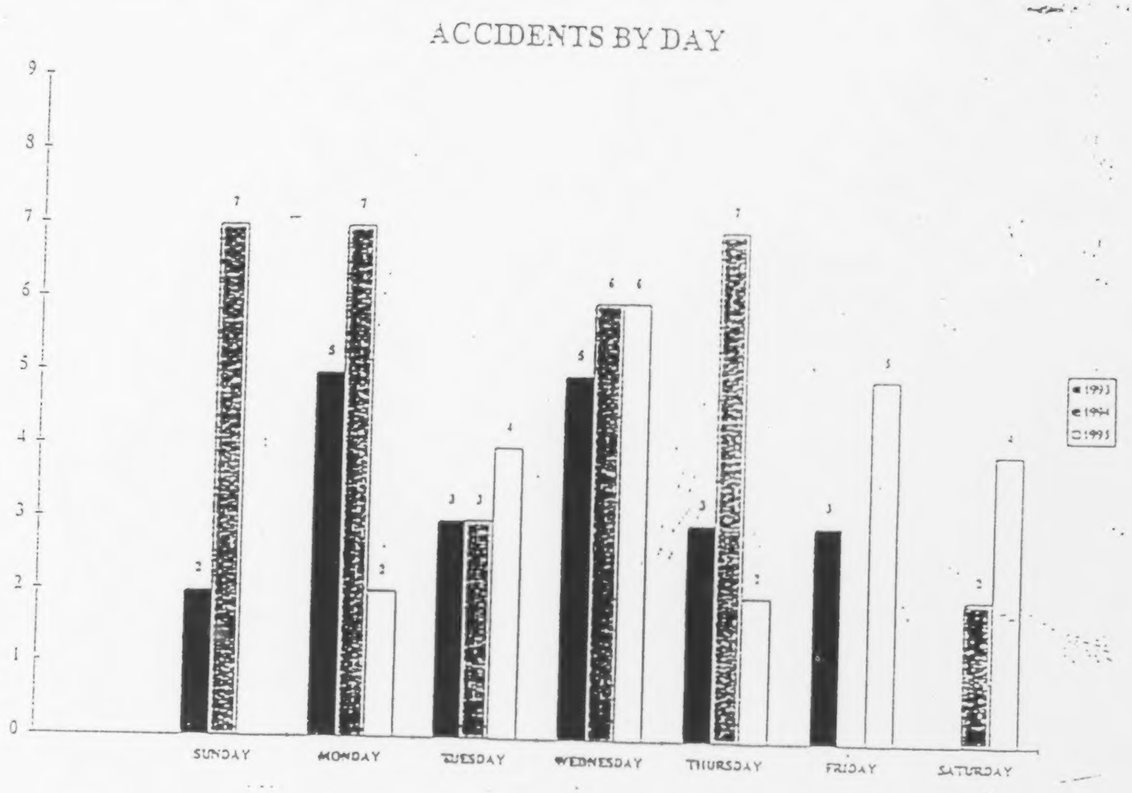


TYPES OF ACCIDENTS
(JUNE)

1. What is the title of this graph?______________________________

2. What type of data is represented on the x-axis?_______________

3. What type of units are represented on the y-axis?____________



ACCIDENTS BY DAY

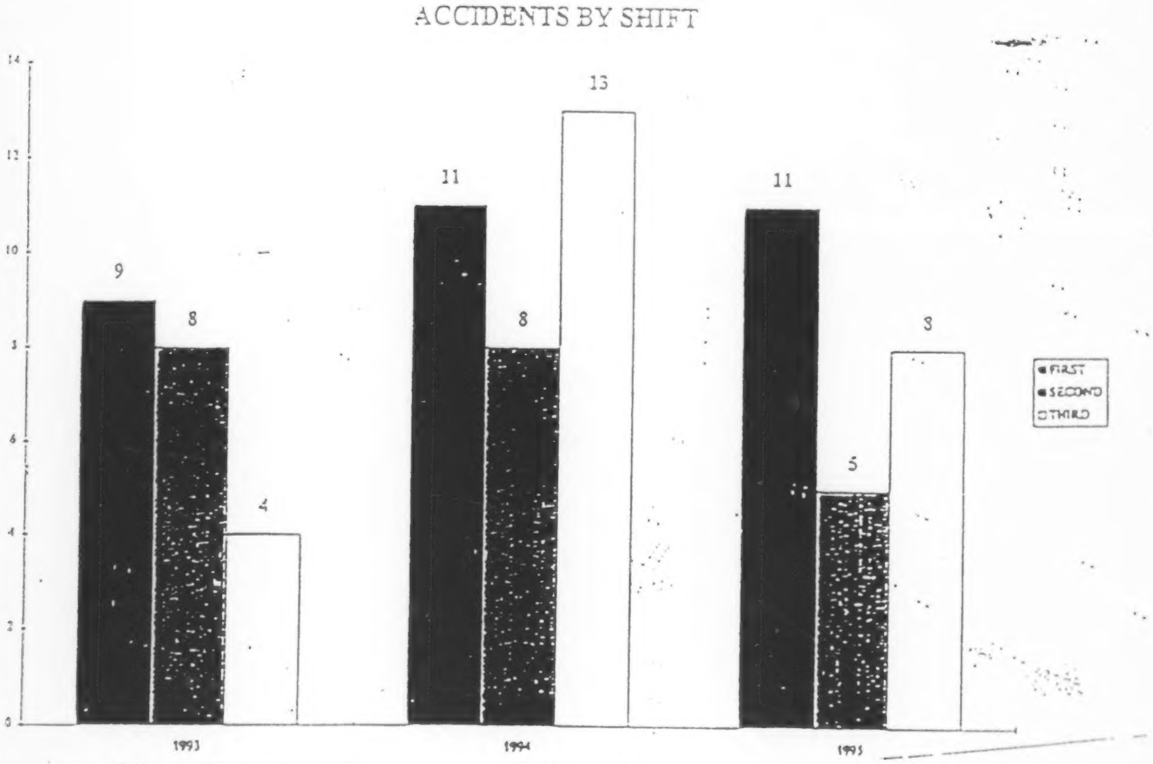
1. In 1994, which days show the same number of accidents per day?

____

2. In 1993, which day show the least amount of accidents per day?

____

3. In 1995, there were accidents no recorded accidents on Sunday?
(circle one) T or F



ACCIDENTS BY SHIFT

1. Which shift has recorded the highest number of accidents in 1994?
____

2. Based on the data how would you summarize the accidents by shift over the time periods indicated?______________________________

Directions: Read the table below. Answer the questions.

DEPARTMENT	HOURS	JUNE ACCIDENTS	Y-T-D ACCIDENTS	JUNE LW D	Y-T-D LWD
MAINT.	23000	0	4	0	0
MIXING	16360	2	1	0	1
BAKING	16800	0	2	0	1
PACKING	62745	1	3	0	2
ENVIRON.	6609	0	0	0	0
WAREHOUSE	1345	0	0	0	0
SALARIED	20209	0	1	0	1
TOTAL	147068	3	11	0	5

1. According to the table, the Packing Department recorded the highest number of hours? (circle one) T or F

2. What was the total number of hours for all departments?__________

3. What was the June accident rate for the Mixing Department?________________________

4. What is the Y-T-D Accident Rate for this facility?

____

Directions: Look at the computer print outs of various data collected by Nabisco employees as they monitor the production process. Then answer the questions.

Chart #1 Product A

1. What are the upper and lower control limits shown on the chart?

____

2. The first sample on August 11 was at 7:40 a.m. Express that time in military time.____________________

3. In your own words, explain what information you understand is being shown in this chart?________________________________

____

Product A, Shift 2, August 7-11, % Moisture

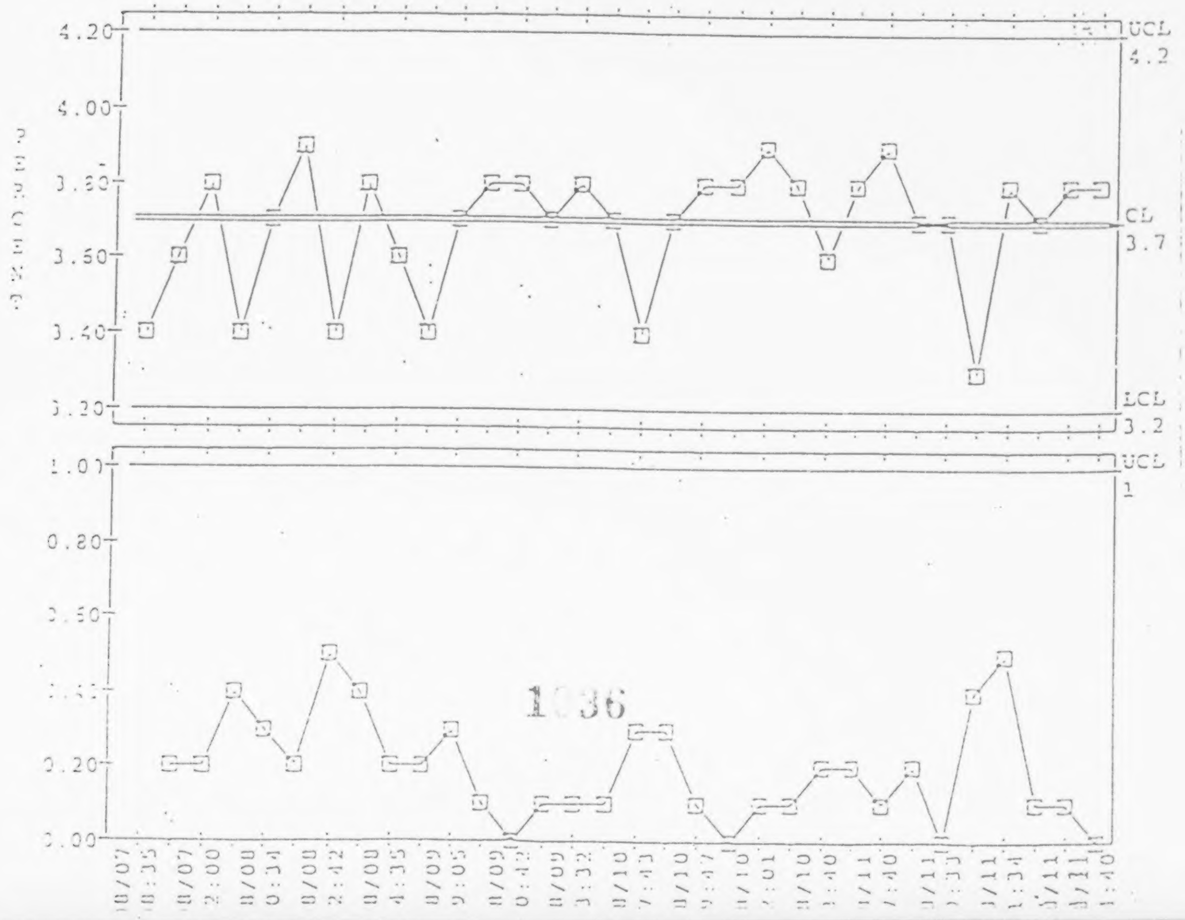
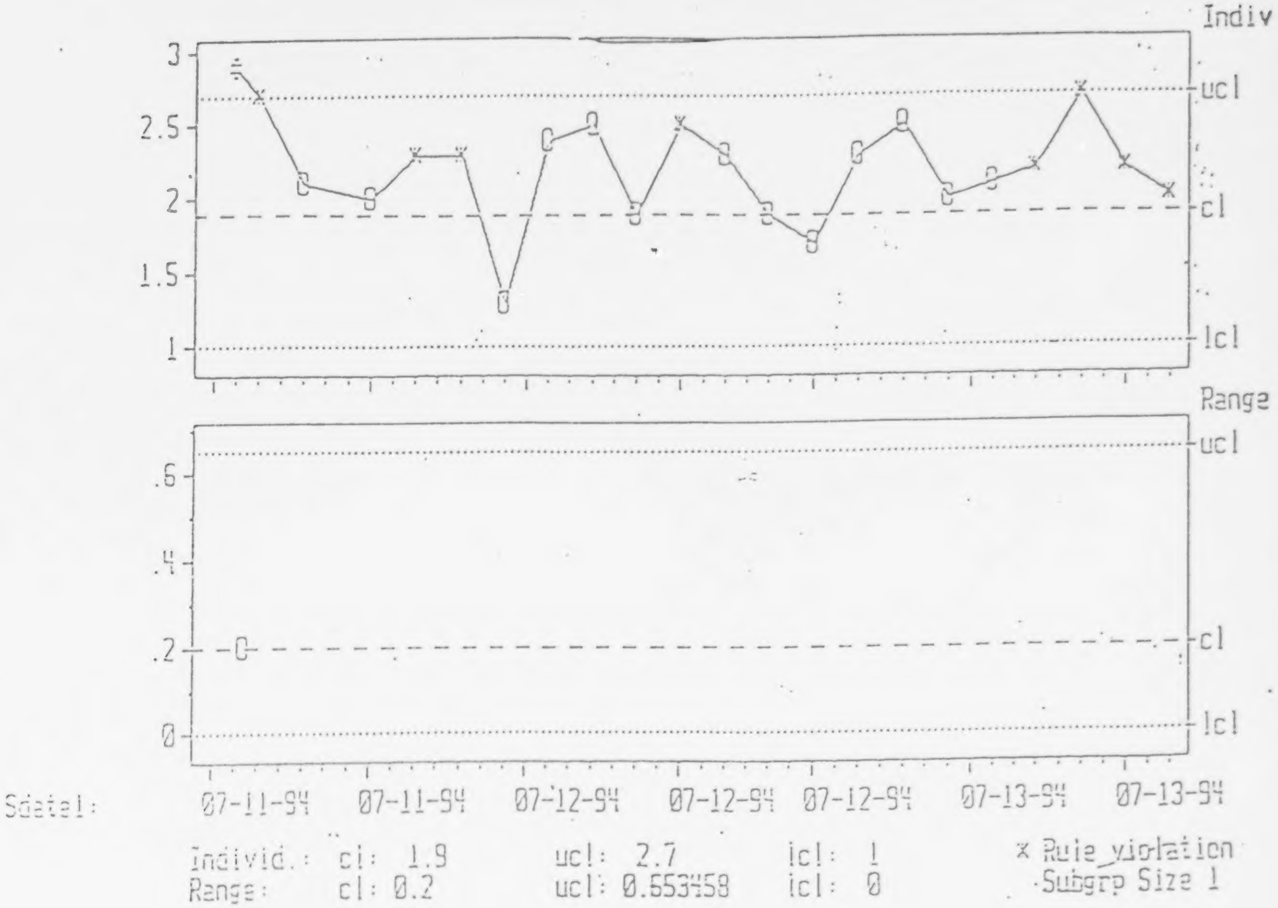


Chart #2

Product B, Shift 3, July 11-13, % Moisture



1. What is the upper control limit shown on the chart?
____

2. According to the data on the chart, numerous rule violations occurred. True____ False____

3. What symbol represents a rule violation on this chart?______
____

4. In your own words, explain what information you understand is being shown in this chart?______________________________________

Activity: 1 - Workplace Vocabulary

Objective(s):
1. Recognize and read workplace vocabulary words.
2. Change information from one form (syllables) to another form (full word).
3. Transfer information accurately.

Materials Required:
1. Workplace Vocabulary Lists

You need to know:

1. Syllables are parts of words. (Syl-la-bles)
2. Some words have only one syllable. For example: salt
3. Most words have more than one syllable.
   For example: sodium = so-di- um
4. Most of the time, syllables need to have a vowel to help them make the sounds that distinguish words from each other.
   The vowels are: a, e, i, o, u and sometimes y.

Directions:
1. Look at the list of workplace words and phrases on the opposite page.
2. The words and phrases have been separated into syllables.
3. Try to sound out or read the syllables.
4. Say the syllables together until you think you recognize the word or phras
   Have you heard the word before?
5. Write the word or phrase (group of words) you recognize in the space ne
   to the syllables of the word.
6. What other vocabulary words can you think of from your work area?
7. Add those words to the list. Ask for help if you need it.

Activity: _ - Workplace Vocabulary (continued)

Syllable	Word	Syllable	W
1. ad-just-ments			
2. a-ver-age			
3. con-trol charts			
4. de-part-ment			
5. dough build-up			
6. dough edg-es			
7. dough hop-per			
8. dough sam-ples			
9. gra-vi-ty			
10. guage rol-ler			
11. mal-func-tion			
12. mon-i-tor			
13. o-ven-band			
14. re-si-due			
15. salt hop-per			
16. salt read-ing			
17. suc-tion hose			

Workplace Vocabulary - Sanitor/Utility

Syllables	Word
o ver heads	
sa ni tize	
fil ter bags	
brea ther bags	
mag ne tic se pa ra tor	
flo ta tion u nit	
mez za nine	
sif ter tail ings	
con ta mi na tion	
in fes ta tion	
pher mone	
fu mi ga tion	
phos tox in	
me thyl	
py re thrum	
gas tech	
mo dule	
re si du al spray	
ha zar dous ma te ri al	
ex haust	
fork lift	
flo ta tion u nit	
in ven to ry sheet	
cer ti fi ca tion	

Sanitor/Utility cont.

Syllable	Word
e le va tor pits	
mag ni fy ing glass	
e mer gen cy kit	
neu tra lize	
a ci dic	
pes ti cide	
meal grin ders	
che mi cal sub stan ces	
phy si cal ha zard	
e mer gen cy pro ce dures	
pro tec tive e quip ment	
safe ty man u al	
ha zard com mu ni ca tion	
com bus ti ble	
cor ro sive	
car ci no gen	
ha zar dous in gre di ent	
flam ma ble	
per mis si ble ex po sure li mit	
dis po sa ble	
dis in fec tant	
res pi ra tor	
cer ti fied ap pli ca tor	

Activity: 1 - Workplace Vocabulary

Objective(s):

1. Recognize and read workplace vocabulary words.
2. Change information from one form (syllables) to another form (full word).
3. Transfer information accurately.

Materials Required:

1. Workplace Vocabulary Lists

You need to know:

1. Syllables are parts of words. (Syl-la-bles)
2. Some words have only one syllable. For example: salt
3. Most words have more than one syllable.
   For example: sodium = so-di-um
4. Most of the time, syllables need to have a vowel to help them make the sounds that distinguish words from each other.
   The vowels are: a, e, i, o, u and sometimes y.

Directions:

1. Look at the list of workplace words and phrases.

2. The words and phrases have been separated into syllables.

3. Try to sound out or read the syllables.

4. Say the syllables together until you think you recognize the word or phrase. Have you heard the word before?

5. Write the word or phrase (group of words) you recognize in the space next to the syllables of the word.

6. What other vocabulary words can you think of from your work area?

7. Add those words to the list. Ask for help if you need it.

Activity: 1 - **Workplace Vocabulary** (continued)

Syllable	Word	Syllable	Word

Activity: 2 - Abbreviations and Symbols (continued)

______ 1

______ 2

______ 3

______ 4

______ 5

______ 6

______ 7

______ 8

______ 9

______ 10

______ 11

______ 12

______ 13

______ 14

______ 15

______ 16

______ 17

______ 18

______ 19

______ 20

______ 21

______ 22

______ 23

______ 24

______ 25

26

a.

b.

c.

d.

e.

f.

g.

h.

i.

j.

k.

l.

m.

n.

o.

p.

q.

r.

s.

t.

u.

v.

w.

x.

y.

z.

Activity: 2 - Abbreviations and Symbols

Objective(s):

1. Recognize workplace abbreviations and acronyms commonly used.
2. Change information from one form (whole word) to another form (abbreviation

Materials Required:

Pen or pencil

You need to know:

1. Abbreviations are a short way to write a word.
2. Most abbreviations are made by taking some of the letters out of a word.
3. Some abbreviations are very different from their words.
4. Acronyms are a special kind of abbreviation. Acronyms are words that are made from the first letters of a phrase. Example: WOW stands for War on Waste at the Richmond Nabisco Facility.

Directions:

1. On the next page, put the letter of the abbreviation next to the correct word.

2. Can you think of any abbreviations used in your work area?

3. Add them to the list.

Abbreviations and Symbols

____ 1. Good Manufacturing Procedures

____ 2. Material Safety Data Sheet

____ 3. Occupational Safety and Health Administration

a. MSDS

b. OSHA

c. GMP

Activity: 3 - Personal Word Bank

Objective(s):

1. Transfer information from a source to a document and proofread.
2. Compile and maintain personal word bank of terms, abbreviations and acronyms.

Materials Required:

1. Completed workplace vocabulary list
2. Personal word bank sheets

Directions:

1. Put a check by all the words on your vocabulary list that you need to learn more about.

2. Write the words and their abbreviation (if they have one) in your personal word bank on the page. You can get more sheets as you need them.

3. Proofread (check) the words to be sure you spelled them correctly.

4. Read the headings for each of the columns in the word bank.

5. Fill in the spaces with as much as you now know about each of your words.

6. Each day, add more information to your word bank as you learn more about your words.

7. Each day, add words that you need to learn more about to your word bank. Talk to your facilitator about how many words you should add to your word bank each day.

PERSONAL WORD BANK

WORD	ABBREVIATION OR ACRONYM	WHERE SEEN? (LABEL,FORM,SIGN)	WHERE HEARD? JOB OR DEPT. USED IN	WHAT IS IT?

Activity: 4 - Reading Safety Guidelines

Objective(s):
1. To recognize key words in safety rules.
2. To use logic in completing the meaning of safety rules.
3. To transfer information and proofread.

Materials Required:
1. Nabisco Safety Guidelines Sheet
2. Word List

You need to know:

1. To do any kind of job or task right, you have to know what the terms mean that are being used in the job.
2. You can understand many terms just by the context (the setting in which a word is used).
3. When you come across a new word, underline it or write it down. But don't think about the meaning of the word yet.
4. Read the sentence and understand the idea that is presented.
5. Once you understand the context, guess at the meaning of the new word. Many times you'll be right!

Activity: 4 - Reading Safety Guidelines (continued)

Directions:

1. Read the word list below. Ask for help with words you don't know.
2. Read the rules on the opposite page carefully. Think about the clues you get in each rule. Ask for help with words you don't know.
3. Think about the meaning of each of the rules and then fill in the spaces with a word from the list. Use each word only once.
4. Read the completed rules.
5. Do the rules make complete sense now? Ask for help if you need it.
6. Add any words you had trouble with to your word bank.

Word List

clogs
minor
spills
posted
unsafe
smoking
jewelry

lounges
qualified
littering
prohibited
operating
committee
emergency

medical
non-skid
production
equipment
supervision
training
evacuation

extinguisher
fork lifts
recommend
open-toed
transporters
safety signs
operate

Activity: 4 - Reading Safety Guidelines (continued)

In addition to the key essential safety rules, the following safety guidelines also apply to the Richmond Facility:

1. Observe all _______________ and/or restrictions.
2. _________________ is only permitted in the following areas: cafeteria, lounges and offices where posted.
3. Only ____________ operators are permitted to __________ transporters, forklifts, etc., for their intended use.
4. High-heels, ________, moccasins, sandals, and ___________ shoes are _____________ while at work. Safe, ___________ soles in good condition are ______________ for all employees.
5. Report and/or clean up ________ immediately to prevent falls. ___________ is prohibited.
6. _________ may not be worn in _____________ areas. The only exception is wedding bands.
7. Stop and check for _____________ and other moving equipment prior to entering all walkways.
8. Broken/damaged ________________ (stools, ladders, etc.) must not be used and must be reported to _________________ at once for corrective action.
9. All "Safe ______________ Procedures" (chemical handling, confined space entry, machine/equipment operation, etc.), as covered in a ______________ class or as _________, must be followed.
10. Always be alert to ____________ conditions and practices. Notify supervision or a member of the safety ______________ of any unsafe condition and/or unsafe act immediately.
11. Know the location of the nearest ___________ phone, fire _________________, fire exit, and know the facility ____________ procedure.
12. Report all injuries, regardless of how ____________, to your immediate supervisor and/or the ________ department.

The above safety rules and expectations apply to the Richmond Facility and are not all inclusive.

Activity: 4 - Reading Safety Guidelines (continued)

In addition to the key essential safety rules, the following safety guidelines also apply to the Richmond Facility:

1. Observe all **safety signs** and/or restrictions.
2. **Smoking** is only permitted in the following areas: cafeteria, lounges and offices where posted.
3. Only **qualified** operators are permitted to **operate** transporters, forklifts, etc., for their intended use.
4. High-heels, **clogs**, moccasins, sandals, and **open-toed** shoes are **prohibited** while at work. Safe, **non-skid** soles in good condition are **recommended** for all employees.
5. Report and/or clean up **spills** immediately to prevent falls. **Littering** is prohibited.
6. **Jewelry** may not be worn in **production** areas. The only exception is wedding bands.
7. Stop and check for **fork lifts** and other moving equipment prior to entering all walkways.
8. Broken/damaged **equipment** (stools, ladders, etc.) must not be used and must be reported to **supervision** at once for corrective action.
9. All "Safe **Operating** Procedures" (chemical handling, confined space entry, machine/equipment operation, etc.), as covered in a **training** class or as **posted**, must be followed.
10. Always be alert to **unsafe** conditions and practices. Notify supervision or a member of the safety **committee** of any unsafe condition and/or unsafe act immediately.
11. Know the location of the nearest **emergency** phone, fire **extinguisher**, fire exit, and know the facility **evacuation** procedure.
12. Report all injuries, regardless of how **minor**, to your immediate supervisor and/or the **medical** department.

The above safety rules and expectations apply to the Richmond Facility and are not all inclusive.

Activity: 5 - Reading Safety Rules

Richmond Bakery/Distribution Center Safety Rules and Expectations

The Richmond Facility makes every effort to provide you with working condi-tions that are pleasant and safe. However, you have a personal responsibility as well by following established safety rules and expectations in order to protect yourself and your co-workers from bodily injury. Neglect of your responsibility towards safety and violation of company safety rules cannot be allowed. This is the only way to make our facility a safer and healthier place to live.

The following are KEY ESSENTIAL Safety rules which must be strictly followed. Failure to do so will result in disciplinary action, up to and including discharge.

1. Safety devices and guards may not be removed or bypassed without proper authorization.
2. Compliance with Richmond's Lockout Program is expected of all employees.
3. No one shall at any time, without proper authorization, clean operating equipment within arm's length of any pinch point, conveyor roller or unguarded pulley, chain or sprocket.
4. Only authorized, trained personnel may operate machinery or mechanical equipment. No one shall activate powered equipment without confirming visually or audibly that no one is within arm's length of any moving machinery parts and that all existing guards are in place.
5. Personal protective equipment issued by the company must be worn at all times in areas or jobs where required.
6. No one shall work on or maintain any electrical panel, switch, light fixture, or outlet without de-energizing and locking and tagging out such equipment. No employee shall at any time work on electrical systems above 480V.
7. Air hoses are to be used only for equipment cleaning and not for personal cleaning.
8. No one shall work at heights above six (6) feet (except on a ladder) without some sort of fall restraint.

Activity: 5 - Richmond Bakery Safety Rules - Part I

Objective(s):

1. Read and interpret safety rules.

Materials Required:
Safety Rules and Expectations Handout

Directions:

1. Read the safety handout on the opposite page.
2. Underline any words that you don't know and add those words to your word bank.
3. Ask for help on words that you do not recognize and cannot sound out by yourself.
4. The sentences below are a summary of the rules on the opposite page. Read them carefully.
5. Put the number of the rule by its summary below.
6. Turn this page and check your answers.

_______a. Don't work on electrical current that is more than 480V.
_______b. Be sure no one is close enough to touch any moving parts of a machine before turning the machine on.
_______c. Don't climb higher than six (6) feet above the floor without a railing around you unless you're on a ladder.
_______d. Use air hoses only to clean equipment; not to clean you.
_______e. Get approval to take safety guards off.
_______f. Only approved employees may use machinery.
_______g. Get approval to clean equipment that is within arm's length to a pinch point, conveyor roller or unguarded pulley, chain or sprocket.
_______h. Know and keep the lockout rules.
_______i. Always use your safety equipment while on the job.

Activity 5: Answers

a-6, b-4, c-8, d-7, e-1, f-4, g-3, h-2, i-5

Activity: 6 - Reading to Interpret Richmond Bakery Safety Rules - Part 1

Objective(s):

1. Read and interpret safety rules.
2. Summarize safety rules in the form of a sign.
3. Assign an appropriate color to each safety sign.

Materials Required:

1. Completed Activity 5 materials
2. Blank signs
3. Sign words

Directions:

1. Read the signs on the opposite page.

2. Review the bakery safety rules from Activity 5.

Activity: 6 - Reading to Interpret Richmond Bakery Safety Rules - Part 2

Directions: (continued)

3. Use the blank spaces below to create a safety sign for each of the bakery rules.
4. Choose from the signs and words on the opposite page or use your own words.
5. Be sure the sign you make for each rule is a good summary of that rule.
6. After you make the signs, think about the best color for each sign to be. Write the name of the color on the sign.
7. Discuss with your group where you think the signs should be placed in the bakery. Refer to the rules.

Rule 1			Rule 6
Rule 2			Rule 7
Rule 3			Rule 8
Rule 4			Bonus Rule ☺
Rule 5			Bonus Rule☺

ctvity: 6 - Reading to Interpret Richmond Bakery Safety Rules - Part 2 - Signs

HOLD	CAUTION RESTRAINT NEEDED	AUTHORIZED PERSONNEL ONLY
THINK	STOP HIGH VOLTAGE - 480V	HIGH VOLTAGE
DANGER	STOP ! VOLTAGE > 480V	DO NOT ENTER
KEEP OUT	OBEY LOCKOUT	LOOK OUT FOR TRUCKS
LUNCH BREAK	AUTHORIZED USE ONLY	HANDLE WITH CARE
MACHINE #	APPROVED CLEANING ONLY	LOAD LIMITS ________LBS.
MISSION	NO SMOKING	RETURN TO STORAGE
TARE 575	REJECTED	CAUTION - HIGH VOLTAGE
FRAGILE	STAY AWAY - MOVING PARTS	EQUIPMENT USE ONLY
FIRE EXIT	KEEP HANDS CLEAR	SAFETY GEAR REQUIRED
DANGER - HOT	QUALITY FIRST	STOP - LOOK - LISTEN •ON
DO NOT SHIP	NO. ________ SHIPPERS	DO NOT REMOVE
DO NOT USE	KEEP GUARD IN PLACE	STOP HIGH VOLTAGE LOCKOUT

Activity - Oreo Story

Objective - To have participants practice reading comprehension skills.

Directions - 1. Read the newspaper article on the next page.

2. Answer the following questions about the article.

True or False

_________ 1. The most popular way to eat Oreos is with milk.

_________ 2. The second most popular way to eat Oreos is with coffee.

_________ 3. Generally, most women prefer to twist their Oreos while most of the dunkers are men.

_________ 4. Many Oreos eaters eat the cookies with peanut butter.

_________ 5. A majority of people who twist their Oreos eat the frosted side first.

_________ 6. After twisting, dunking and nibbling Oreos, the other most popular way to eat Oreos is whole.

_________ 7. Fewer than 100,000 people participated in this survey.

_________ 8. The people who participated in this survey filled out a post card and sent it in.

_________ 9. Which of the graphs on the following page best illustrates the way Americans prefer to eat their Oreos. (Put the letter in the blank.)

FLAVOR

Callers tell of twisting, dunking, nibbling Oreos

BY KAREN SHIDELER
KNIGHT-RIDDER NEWSPAPERS

DO WE KNOW how to eat our Oreos or what?

Well, OK, a third of us know you're supposed to twist.

Hey, it's a fact.

More than 174,000 people called a toll-free telephone number to register their opinions on the way to eat Oreos, obviously making the poll highly scientific. "Plus or minus some decimal point," agreed John Barrows, who is on the Nabisco public relations team. "Pinpoint accuracy."

Those who called were asked to choose among twisting, dunking, nibbling or "other." If they chose "other," their comments were recorded. Some, you don't want to know about (Oreos and horseradish).

"We discovered that Americans as a whole prefer to twist by 35 percent, followed by dunking at 30 percent. Nibbling came in last at 16 percent. And 'other' methods actually came in third at 19 percent," Barrows said.

Women twist; men dunk. Except in El Paso, Texas, and Springfield, Mo., where it's the other way around. "We don't know what to make of that," Barrows said.

In Chicago, they dunk. And "every significant city in Pennsylvania registers as a dunking city."

The nibblers are Norfolk; Oklahoma City; Savannah, Ga.; and Kingsport-Johnson City, Tenn.

In the informal poll, dunking was the second-most popular method of eating Oreos.

Denver and Salt Lake City are among the places people prefer those "other" methods.

"The most popular 'other' was probably eating them whole. One pop," Barrows said.

And lots of people have to have their Oreos with something, Barrows found in reading the 28,000 transcribed "other" replies. "Of course, the No. 1 combination obviously was Oreos and milk." Obviously. The second most popular was Oreos and peanut butter.

Peanut butter?

"That's what I said, and I never in a million years would have tried it," said Barrows, who – in the name of job dedication – did. "And you know, it's actually quite good."

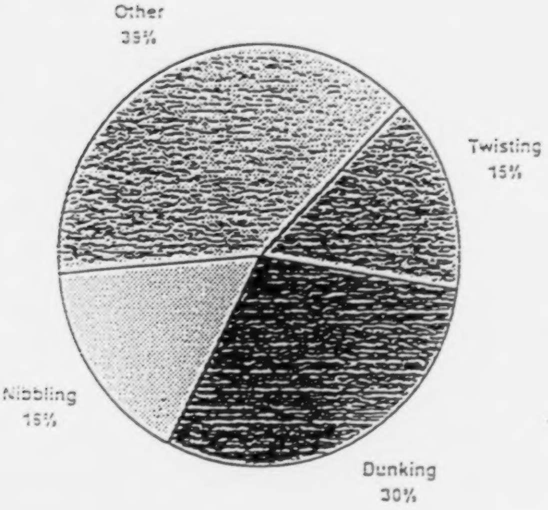
The peanut butter group fell into two subspecies: Those who use the Oreo like a chip and the peanut butter like a dip, and those who crack open the cookie, spread a precise amount on one side and put the cookie back together.

Also among the other combinations: Oreos with salsa. Oreos with beer. Oreos with coffee. And the aforementioned horseradish. "I think we had a list of 60 different things. . . . And no, I haven't tried hardly any of them." Barrows eats his Oreos "the good, old-fashioned way: three bites. Three even bites. No twisting, no dunking."

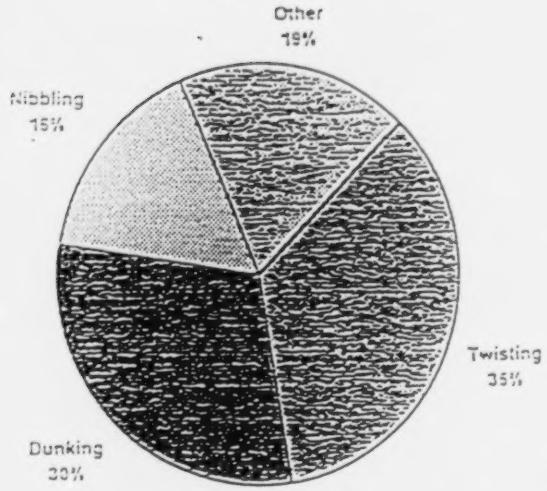
Nabisco didn't bother to ask twisters which side of the cookie should be eaten first – the plain side or the frosting side. "We figured this was enough information to compile this year," Barrows said. "We are thinking about doing further study next year."

In Chicago, they dunk. The nibblers are Norfolk; Oklahoma City; Savannah, Ga.; and Kingsport-Johnson City, Tenn.

C.


Other
39%
Twisting
15%
Nibbling
15%
Dunking
30%

D.


Other
19%
Nibbling
15%
Twisting
35%
Dunking
30%

Reading Comprehension - Reading MSDS

Activity 1- Becoming Familiar with a Material Data Safety Sheet (MSDS)

Objective (s): This activity will enable participants

1. To understand the importance of a MSDS sheet.

2. To become familiar with a MSDS sheet.

Material Needed: pencil

Directions: Read the paragraph below. Think about the information you are reading. Consider what important points are presented. Then answer the questions. You may refer back to the paragraph, if you missed some details in reading.

Material Data Sheets are Important

In some work environments it is necessary for employees to handle or use hazardous chemicals. For example, at Nabisco the Environmental Health & Safety Department's Sanitation and Utility Technicians use various chemicals to sanitize areas and equipment. To succeed in doing a good and safe job, the technicians must understand how to use chemicals in a safe way. That's why the hazardous chemicals have their very own Material Safety Data Sheet (MSDS). MSDS are very important to Nabisco employees because they provide written information (or data) about how to use, handle, and store the chemical safely. Each MSDS may look a little different, but they all give the same basic information. If a sanitation employee has questions about a MSDS sheet, he/she should ask a supervisor. The sheet has the following sections:

1. Chemical Identification
2. Hazardous Ingredients
3. Physical Data
4. Fire & Explosion Data
5. Health Hazards
6. Reactivity Data
7. Spill or Leak Procedures
8. Special Protection
9. Special Precautions

Questions: Please fill in the blank or check the correct answer.

1. After reading the paragraph, what is your definition of a MSDS sheet?______________________________________

2. What are the major sections of a MSDS sheet?_________________
____
____

3. Why are MSDS sheets important?___________________________
____
____

4. If an employee has a question about a MSDS sheet, who should he/she ask?____

5. Why do you think it is important to read a MSDS sheet?
____

6. Every hazardous chemical used at Nabisco has a MSDS sheet that is organized in the same way? True____ False____

7. The MSDS sheet tells you how to use________, __________ and __________the chemical safely.

8. What can you find out by reading a MSDS Sheet?_________________
____

9. Most MSDS sheets have nine basic sections of information.
True____ False____

Activity 2 - Understanding the Contents of the MSDS Sheets

Objective (s): This activity will enable participants

1. The become familiar with the contents of MSDS.

2. To understand how most material data sheets are organized.

Materials Needed: MSDS sheet contents handout, MSDS with missing section names, pencils

Directions: Read the handout about the sections of a MSDS sheet. Notice the names of the sections in BOLD face type.

Contents of a Material Safety Data Sheet

The MSDS for each hazardous chemical in your work area tells you how to use, handle, and store the chemical safely. Each MSDS may look a little different, but all give you the same basic information. Read the information below to learn more about what's included in the different sections of a MSDS sheet. If you have any specific questions, you can check with your supervisor.

Chemical Identification. The first section of the MSDS helps you identify the chemical. It lists the name of the chemical, any trade names, and the chemical manufacturer's name and address. This section may also list an emergency telephone number.

Hazardous ingredients. This section lists what's in the chemical that can harm you. It also lists the concentration of the chemical to which you an safely be exposed, often listed as the ***permissible exposure limit (PEL)*** or the *threshold limit value (TLV)*. These safe exposure limits are usually figured for average exposures over a typical work shift.

Physical Data. This section describes the chemical's appearance, odor, and other characteristics, ***percent volatile***, for instance, is how much of the chemical evaporates at room temperature. It can be harmful if inhaled. Respiratory protection or extra ventilation may be needed.

Contents of a Material Safety Data Sheet

Fire & Explosion Data. Here you can find at what temperature the chemical ignites called the ***flash point***. If a chemical is **flammable**, it ignites below 100°F. If it's ***combustible*** it ignites at 100°F or above. This section also lists **extinguishing media** - what will put out the fire safely- such as water spray, foam, or other type fire extinguisher.

Health Hazards. This section lists symptoms of overexposure, such as skin rash, burn, headache, or dizziness. It also tells you first aid and emergency procedures in case of overexposure, such as flushing your exposed skin running water for 15 minutes. It may also list any medical conditions that can be aggravated by exposure to the chemical.

Reactivity Data. Here you'll find whether the chemical "reacts" with materials or conditions. ***Incompatibility*** lists the materials, such as water or other chemicals, that cause the chemical to burn, explode, or release dangerous gases. ***Instability*** lists the environmental conditions, such as heat or direct sunlight, that cause a dangerous reaction.

Spill or Leak Procedures. This section tells you what to use to clean up an accidental spill or leak. No matter what the chemical is, always notify your supervisor right away. Before cleaning up a chemical spill, you may need to wear respiratory protection, gloves, safety goggles, or protective clothing. This section may also include notes on how to dispose of the chemical safely.

Contents of a Material Safety Data Sheet

Special Protection. Here you'll find a listing of any personal protective equipment (respiratory protection, gloves, eye protection) you need to work safely with the chemical. If protective equipment is needed, this section may list the specific types that are recommended, such as full-face mask respirator, rubber gloves, and chemical safety goggles.

Special Precautions. This section lists any other special precautions to follow when handling the chemical. This may include what to have nearby to clean up a spill or put out a fire, and what safety signs to post near the chemical. This section also lists any other health and safety information not covered in other parts of the MSDS.

Activity 3 - Identifying & Understanding the Contents of a MSDS Sheet

Objective (s): This activity will enable particpants

1. To become familiar with the contents of a MSDS.

2. To understand how most material data sheets are organized.

Material Needed: Sheets with missing section names, pencils

Directions: Use the handout you just READ from Activity 2 about the contents of MSDS sheets. Now, fill in the missing section names on the MSDS sheets provided.

H&R
Haarmann & Reim
A MILES INC. COMPANY
70 Diamond Road
Springfield, New Jersey 07

Material Safety Data Sheet

In Case of Emergency Call:
CHEMTREC (800) 424-9300
For Other Information Call: (800) 422-1559

PAGE 1

Hazard Present:
Health: 1
Flammability: 0
Reactivity: 0

Hazard
0 = Insign
1 = Slight
2 = Mode
3 = Serio
4 = Sever

I.

A. PRODUCT NAME : 263772 DARITEEN NCF-247H(COLORED)

B. CHEMICAL NAME : ENZYME MODIFIED CHEDDAR CHEESE (PROCESSED CHEESE T

C. CLASSIFICATION : FLAVOR MATERIAL

D. CAS NO. : NA

II.

A. FLASH POINT (CC / DEG F) : NF

B. EXTINGUISHING MEDIA : (Y) H2O FOG; (Y) FOAM; (Y) CO2; (Y) DRY CHEMI

C. SPECIAL PROCEDURES/UNUSUAL HAZARDS : USE SELF CONTAINED BREATHING APPARATUS. FIRE WILL GENERATE CO, CO2, AND SMOKE.

D. STABILITY : STABLE UNDER NORMAL CONDITIONS OF STORAGE AND USE.

E. CONDITIONS/MATERIALS TO AVOID : AVOID CONTACT WITH STRONG OXIDIZING AGENTS.

F. HAZARDOUS POLYMERIZATION POTENTIAL : NONE.

III.

A. EYE : SAFETY GLASSES

B. SKIN : OIL/SOLVENT RESISTENT GLOVES.

C. RESPIRATORY : RESPIRATORY : NOT REQUIRED

D. OTHER : USE IN A WELL VENTILATED AREA.

E. EXPOSURE LIMITS : NOT ESTABLISHED.

PRODUCT : 263092

Hazard Present:
Health: 1
Flammability: 0
Reactivity: 0

Hazar
0 - Insi
1 - Slig
2 - Mod
3 - Seri
4 - Sev

IV.

A. INHALATION EXPOSURE : REMOVE TO FRESH AIR.

B. EYE CONTACT : FLUSH WITH WATER FOR 15 MINUTES. CONSULT PHYSICIAN IRRITATION CONTINUES.

C. SKIN CONTACT : WASH WITH SOAP AND WATER.

D. OTHER : NONE.

V.

A. INGREDIENTS(S) POSING HAZARD : NOT APPLICABLE.

B. ROUTE OF EXPOSURE AND EFFECTS OF OVEREXPOSURE : PROLONGED OR REPEAT CONTACT MAY CAUSE SKIN IRRITATION. MAY CAUSE EYE IRRITATION.

VI.

A. APPEARANCE AND ODOR : CREAM COLORED PASTE

B. PHYSICAL PROPERTIES : NF

VII.

A. SPILLS AND LEAKS : COLLECT ONTO INERT ABSORBENT. PLACE INTO A SUITABLE CONTAINER.

B. DISPOSAL : DISPOSE OF IN ACCORDANCE WITH LOCAL REGULATIONS.

VIII.

KEEP CONTAINERS TIGHTLY CLOSED, STORE IN A COOL DRY AREA AWAY FROM HEAT AND DIRECT SUNLIGHT.

Material Safety Data Sheet
May be used to comply with
OSHA's Hazard Communication Standard,
29 CFR 1910.1200. Standard must be
consulted for specific requirements.

U.S. Department of Labor
Occupational Safety and Health Administration
(Non-Mandatory Form)
Form Approved
OMB No. 1218-0072

IDENTITY (As Used on Label and List)

Note: Blank spaces are not permitted. If any item is not applicable, or no information is available, the space must be marked to indicate that.

Section I

Manufacturer's Name AJINOMOTO CO., INC.	Emergency Telephone Number NJ OFFICE : 201-488-1212
Address (Number, Street, City, State, and ZIP Code) TOKYO, JAPAN	Telephone Number for Information NJ OFFICE : 201-488-1212
	Date Prepared 3-28-91
	Signature of Preparer (optional)

Section II —

Hazardous Components (Specific Chemical Identity; Common Name(s))	OSHA PEL	ACGIH TLV	Other Limits Recommended	% (optional)
MONOSODIUM L-GLUTAMATE MONOHYDRATE (MONOSODIUM GLUTAMATE)				

Section III — Physical/Chemical Characteristics

Boiling Point	SOLID	Specific Gravity (H_2O = 1)	1.62
Vapor Pressure (mm Hg.)	28.1@25°	Melting Point	450 F 232 C
Vapor Density (AIR = 1)	N/A	Evaporation Rate (Butyl Acetate = 1)	NONE

Solubility in Water
17g/100g H_2O at 25°C

Appearance and Odor
WHITE OR ALMOST WHITE NEEDLES OR POWDER WITH A SLIGHT PEPTONE ODOR

Section IV —

Flash Point (Method Used) NOT ESTABLISHED	Flammable Limits NON-FLAMMABLE	LEL	UEL

Extinguishing Media
IF INVOLVED IN FIRE, WATER OR CO_2 MAY BE USED

Special Fire Fighting Procedures
NONE SPECIAL, NONE NORMALLY REQUIRED

Unusual Fire and Explosion Hazards

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Section V —

Stability	Unstable		Conditions to Avoid
	Stable	X	DECOMPOSES AT TEMPERATURES ABOVE 375°

Incompatibility (Materials to Avoid) NONE REPORTED

Hazardous Decomposition or Byproducts NONE

Hazardous Polymerization	May Occur		Conditions to Avoid
	Will Not Occur	X	NONE

Section VI —

Route(s) of Entry: Inhalation? Skin? Ingestion? X

Health Hazards (Acute and Chronic)

GENERALLY RECOGNIZED AS SAFE

Carcinogenicity: NTP? IARC Monographs? OSHA Regulated? NO

Signs and Symptoms of Exposure

NONE. EXCESSIVE CONTACT MAY CAUSE EYE IRRITATION.

Medical Conditions
Generally Aggravated by Exposure

NONE

Emergency and First Aid Procedures NON-TOXIC SUBSTANCE. FLUSH EYE WITH PLENTY OF WATER---

AND GET MEDICAL ATTENTION IF LARGE AMOUNT IS INGESTED

Section VII —

Steps to Be Taken in Case Material Is Released or Spilled

ORDINARY. NO HAZARD RESULTS FROM SPILLAGE.

Waste Disposal Method SWEEP UP AND PLACE IN SUITABLE CLEAN, DRY CONTAINERS FOR

RECLAMATION OR LATER DISPOSAL. DO NOT FLUSH INTO SEWER.

Precautions to Be Taken in Handling and Storing

STORE UNDER NORMAL CONDITIONS OF TEMPERATURE AND HUMIDITY IN CLOSED

Other Precautions CONTAINERS.

Section VIII —

Respiratory Protection (Specify Type) UNNECESSARY OR APPROVED NUISANCE MASK.

Ventilation	Local Exhaust DUST EXHAUST SYSTEM	Special
ORDINARY	Mechanical (General)	Other

Protective Gloves UNECESSARY, NOT REQUIRED | Eye Protection NON_SPECIFY (CHEM. GOGGLE

Other Protective Clothing or Equipment NONE

Work/Hygienic Practices NONE

Activity 4 - Becoming Familiar with the Contents of a MSDS Sheets

Objective (s): This activity will enable participants

1. To practice reading different MSDS Sheets.

2. To practice indentifying the sections of the MSDS Sheets.

Materials Needed: MSDS sheets, color highlighters

Directions: Read through the MSDS sheets provided. Pay close attention to the section names. Use different color highlighters to mark the sections of the sheet as directed by the chart below. You may recognize two of the sheets from Activity 3. However, this time all of the section names are on the sheets.

MSDS Sheet Section	Highlighter Color
1. Chemical Identification	Red
2. Hazardous Ingredients	Green
3. Physical Data	Blue
4. Fire & Explosion Data	Red
5. Health Hazards	Green
6. Reactivity Data	Blue
7. Spill or Leak Procedures	Red
8. Special Protection	Green
9. Special Precautions	Blue

Material Safety Data Sheet

H&R
Haarmann & Reimer
A MILES INC. COMPANY
70 Diamond Road
Springfield, New Jersey 07081

In Case of Emergency Call:
CHEMTREC (800) 424-9300
For Other Information Call: (800) 422-1559

PAGE 1

Hazard Present Hazard Ra
Health Hazard: 1 0 = Insignific
1 = Slight
Flammability: 0 2 = Moderat
Reactivity: 0 3 = Serious
4 = Severe

I. IDENTIFICATION

A. PRODUCT NAME : 263092 DARITEEN NCF-247H(COLORED)

B. CHEMICAL NAME : ENZYME MODIFIED CHEDDAR CHEESE (PROCESSED CHEESE TYP

C. CLASSIFICATION : FLAVOR MATERIAL

D. CAS NO. : NA

II. FIRE, EXPLOSION, AND REACTIVITY DATA

A. FLASH POINT (CC / DEG F) : NF

B. EXTINGUISHING MEDIA : (Y) H2O FOG; (Y) FOAM; (Y) CO2; (Y) DRY CHEMIC

C. SPECIAL PROCEDURES/UNUSUAL HAZARDS : USE SELF CONTAINED BREATHING APPARATUS. FIRE WILL GENERATE CO, CO2, AND SMOKE.

D. STABILITY : STABLE UNDER NORMAL CONDITIONS OF STORAGE AND USE.

E. CONDITIONS/MATERIALS TO AVOID : AVOID CONTACT WITH STRONG OXIDIZING AGENTS.

F. HAZARDOUS POLYMERIZATION POTENTIAL : NONE.

III. PROTECTION INFORMATION AND EQUIPMENT

A. EYE : SAFETY GLASSES

B. SKIN : OIL/SOLVENT RESISTENT GLOVES.

C. RESPIRATORY : RESPIRATORY : NOT REQUIRED

D. OTHER : USE IN A WELL-VENTILATED AREA.

E. EXPOSURE LIMITS : NOT ESTABLISHED.

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H&R

Haarmann & Reime
A MILES INC. COMPANY
70 Diamond Road
Springfield, New Jersey 0708

Material Safety Data Sheet

In Case of Emergency Call:
CHEMTREC (800) 424-9300
For Other Information Call: (800) 422-1559

PRODUCT : 263092

Hazard Present · Hazard Ra
Health: 1
Flammability: 0
Reactivity: 0

0 = Insignific
1 = Slight
2 = Moderat
3 = Serious
4 = Severe

IV. EMERGENCY FIRST AID

A. INHALATION EXPOSURE : REMOVE TO FRESH AIR.

B. EYE CONTACT : FLUSH WITH WATER FOR 15 MINUTES. CONSULT PHYSICIAN IF IRRITATION CONTINUES.

C. SKIN CONTACT : WASH WITH SOAP AND WATER.

D. OTHER : NONE.

V. HEALTH HAZARD DATA

A. INGREDIENTS(S) POSING HAZARD : NOT APPLICABLE.

B. ROUTE OF EXPOSURE AND EFFECTS OF OVEREXPOSURE : PROLONGED OR REPEATE CONTACT MAY CAUSE SKIN IRRITATION. MAY CAUSE EYE IRRITATION.

VI. PHYSICAL DATA

A. APPEARANCE AND ODOR : CREAM COLORED PASTE

B. PHYSICAL PROPERTIES : NF

VII. SPILL, LEAK, AND DISPOSAL PROCEDURES

A. SPILLS AND LEAKS : COLLECT ONTO INERT ABSORBENT. PLACE INTO A SUITABLE CONTAINER.

B. DISPOSAL : DISPOSE OF IN ACCORDANCE WITH LOCAL REGULATIONS.

VIII. HANDLING AND STORAGE PROCEDURES

KEEP CONTAINERS TIGHTLY CLOSED. STORE IN A COOL DRY AREA AWAY FROM HEAT AND DIRECT SUNLIGHT.

PRODUCT : 265092

Hazard Present
Health: 1
Flammability: 0
Reactivity: 0

Hazard Ratin
0 = Insignifican
1 = Slight
2 = Moderate
3 = Serious
4 = Severe

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Material Safety Data Sheet
May be used to comply with
OSHA's Hazard Communication Standard,
29 CFR 1910.1200. Standard must be
consulted for specific requirements.

U.S. Department of Labor
Occupational Safety and Health Administration
(Non-Mandatory Form)
Form Approved
OMB No. 1218-0072

IDENTITY *(As Used on Label and List)*

Note: Blank spaces are not permitted. If any item is not applicable, or no information is available, the space must be marked to indicate that.

Section I

Manufacturer's Name AJINOMOTO CO., INC.	Emergency Telephone Number NJ OFFICE : 201-488-1212
Address *(Number, Street, City, State, and ZIP Code)* TOKYO, JAPAN	Telephone Number for Information NJ OFFICE : 201-488-1212
	Date Prepared 3-26-91
	Signature of Preparer *(optional)*

Section II — Hazardous Ingredients/Identity Information

Hazardous Components (Specific Chemical Identity; Common Name(s))	OSHA PEL	ACGIH TLV	Other Limits Recommended	% *(optional)*
MONOSODIUM L-GLUTAMATE MONOHYDRATE (MONOSODIUM GLUTAMATE)				

Section III — Physical/Chemical Characteristics

Boiling Point	SOLID	Specific Gravity (H_2O = 1)	1.62
Vapor Pressure (mm Hg.)	28-1@25°	Melting Point	450°F 232°C
Vapor Density (AIR = 1)	N/A	Evaporation Rate (Butyl Acetate = 1)	NONE

Solubility in Water
17g/100g H_2O at 25°C

Appearance and Odor
WHITE OR ALMOST WHITE NEEDLES OR POWDER WITH A SLIGHT PEPTONE ODOR

Section IV — Fire and Explosion Hazard Data

Flash Point (Method Used) NOT ESTABLISHED	Flammable Limits NON-FLAMMABLE	LEL	UEL

Extinguishing Media
IF INVOLVED IN FIRE, WATER OR CO_2 MAY BE USED

Special Fire Fighting Procedures
NONE SPECIAL, NONE NORMALLY REQUIRED

Unusual Fire and Explosion Hazards

NONE REPORTED

BEST COPY AVAILABLE

Section V — Reactivity Data

Stability	Unstable		Conditions to Avoid
	Stable	X	DECOMPOSES AT TEMPERATURES ABOVE 375°

Incompatibility (Materials to Avoid) NONE REPORTED

Hazardous Decomposition or Byproducts NONE

Hazardous Polymerization	May Occur		Conditions to Avoid
	Will Not Occur	X	NONE

Section VI — Health Hazard Data

Route(s) of Entry:	Inhalation?	Skin?	Ingestion? X

Health Hazards (Acute and Chronic)

GENERALLY RECOGNIZED AS SAFE

Carcinogenicity:	NTP?	IARC Monographs?	OSHA Regulated? NO

Signs and Symptoms of Exposure

NONE. EXCESSIVE CONTACT MAY CAUSE EYE IRRITATION.

Medical Conditions Generally Aggravated by Exposure

NONE

Emergency and First Aid Procedures NON-TOXIC SUBSTANCE. FLUSH EYE WITH PLENTY OF WATER AND GET MEDICAL ATTENTION IF LARGE AMOUNT IS INGESTED

Section VII — Precautions for Safe Handling and Use

Steps to Be Taken in Case Material Is Released or Spilled

ORDINARY. NO HAZARD RESULTS FROM SPILLAGE.

Waste Disposal Method

SWEEP UP AND PLACE IN SUITABLE CLEAN, DRY CONTAINERS FOR RECLAMATION OR LATER DISPOSAL. DO NOT FLUSH INTO SEWER

Precautions to Be Taken in Handling and Storing

STORE UNDER NORMAL CONDITIONS OF TEMPERATURE AND HUMIDITY IN CLOSED

Other Precautions

CONTAINERS.

Section VIII — Control Measures

Respiratory Protection (Specify Type)

UNNECESSARY OR APPROVED NUISANCE MASK

Ventilation	Local Exhaust DUST EXHAUST SYSTEM	Special
ORDINARY	Mechanical (General)	Other

Protective Gloves UNECESSARY, NOT REQUIRED	Eye Protection NON SPECIFY (CHEM. GOGGLE

Other Protective Clothing or Equipment NONE

Work/Hygienic Practices NONE

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Material Safety Data Sheet

Required under USDL Safety and Health Regulations for Shipyard Employment (29 CFR 1915)

U.S. Department of Labor

Occupational Safety and Health Administration

[redacted]

OMB No. 1218-00

Expiration Date 05/31/

Section I

Manufacturer's Name
Lyoferm, Inc.

Emergency Telephone Num
(317) 359-8578

Address (Number, Street, City, State, and ZIP Code)
3362 E. Washington St.
Indianapolis, IN 46201

Chemical Name and Synonyms

Trade Name and Synonyms "Sour Start" [redacted]

Chemical Family Carbohydrate and Protein

Formula Cultu

Section II - Hazardous Ingredients None

Paints, Preservatives, and Solvents	%	TLV (Units)	Alloys and Metallic Coatings	%	TLV (Units)
Pigments			Base Metal		
Catalyst			Alloys		
Vehicle			Metallic Coatings		
Solvents			Filler Metal Plus Coating or Core Flux		
Additives			Others		
Others					

Hazardous Mixtures of Other Liquids, Solids or Gases	%	TLV (Units)
N/A		

Section III - Physical Data

Boiling Point (°F) N/A		Specific Gravity ($H_2O=1$) N/A	
Vapor Pressure (mm Hg.) N/A		Percent Volatile by Volume (%) (% Moisture)	7%
Vapor Density (Air=1) N/A		Evaporation Rate ________ =1)	

Solubility in Water
Complete

Appearance and Odor
Off-white powder with typical flour odor

Section IV - Fire and Explosion Hazard Data

Flash Point (Method Used) N/A

Flammable Limits N/A

Lel

Uel

Extinguishing Media
Water, CO2, Dry chemical

Special Fire Fighting Procedures
N/A

Unusual Fire and Explosion Hazards
None

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Section V - Health Hazard Data

Threshold Limit Value

N/A

Effects of Overexposure

N/A

Emergency First Aid Procedures

None relating to this product

Section VI - Reactivity Data

Stability	Unstable		Conditions to Avoid N/A
	Stable	x	

Incompatability (Materials to Avoid)

N/A

Hazardous Decomposition Products

N/A

Hazardous Polymerization	May Occur		Conditions to Avoid N/A
	Will Not Occur	x	

Section VII - Spill or Leak Procedures

Steps to be Taken in Case Material is Released or Spilled

Wipe, sweep, vacuum

Waste Disposal Method

Normal dry waste disposal

Section VIII - Special Protection Information

Respiratory Protection (Specify Type)

Ventilation	Local Exhaust Not needed	Special
	Mechanical (General)	Other

Protective Gloves Not needed	Eye Protection Not needed

Other Protective Equipment

Section IX - Special Precautions

Precautions to be Taken in Handling and Storing

No special precautions

Other Precautions

N/A

Activity 5 - Identifying the Contents of a Material Safety Data Sheet (MSDS)

Objective (s): This activity will enable particpants

1. To practice identifying the sections of MSDS Sheets.

Materials Needed: MSDS Sheets

Directions: Answer these questions noting what section of a MSDS Sheet you would find the information. Remember that most MSDS sheets have nine sections. Some information such as regulatory information or how to transport the mateiral maybe included in the special precautions or a separate section. Put the letter that corresponds to the correct section of the MSDS in the space provided.

a. Chemical Identification (General Information)
b. Hazardous Ingredients
c. Physical Data
d. Fire & Explosion Data
e. Health Hazards (Toxicity Information)
f. Reactivity Data
g. Spill or Leak Procedures
h. Special Protection
i. Special Precautions (Regulatory & Transport Information)

1._____What special protection should be worn when handling chemicals?

2._____How to clean up a chemical spill?

3._____What conditions may make a chemcical explode?

4._____Where and how to store a particular chemical?

5._____Is the chemical hazardous to may health?

6._____Who is the manufacturer of the chemical?

7._____What kind of a chemcial am I working with?

8._____What extra precautions should I take when handling a chemical?

9._____What other kind of name the chemical may be called on the market?

10._____What is the make-up or ingredients of a particular chemical?

Activity 6 - Working with MSDS Sheets

Objective (s): This activity will enable participants

1. To practice reading MSDS Sheets.

Materials Needed: Pencil, MSDS Sheet for Limonene, Sodium Chloride and Solution S0636, PA-2.

Directions: Read and MSDS sheets provided. Notice the names of the sections as you read these sheets. Then answer the questions below for each of the products below.

Limonene

1. What is the this product's boiling point?_____

2. In what section did you find the boiling point information?________
____

3. What precautions should be takens when handling and storing this product?____
____
____

4. What is the extinguishing media for this product?____________

5. In what section did you find information about theextinguishing media?____

Sodium Chloride

1. Is this product regulated under OSHA Hazard Communication Standard?________________________________

2. This product can be described as a white crystalline solid with slight halogen odor? Yes_____ No_____

3. What kind of medical conditions can be aggravated by exposure to this product?______________________________

4. What steps should be taken if this product is released or spilled?____

5. Gloves, goggles, and protective clothing must be worn when handling this chemical? True____ False____

Solution S0636, PA,2

1. What is the precautionary label on this solution?____

2. Does this solution have color? Yes____ No____

3. This solution is regulated by OSHA. True____ False____

4. What is the spill control or recovery for this solution?____

(OTS480-0110P -30114158-1740)	DATE OF ISSUE 01/16/95	SUPERSEDES 12/05/94

SECTION I - GENERAL INFORMATION

CHEMICAL NAME & SYNONYMS
N/A

TRADE NAME & SYNONYMS
FRESH FORCE

CHEMICAL FAMILY
ORANGE TERPENE SOLUTION

FORMULA
X<--MIXTURE

MANUFACTURERS NAME:
MINTEK, DIVISION OF NCH CORP.

ADDRESS (NUMBER, STREET, CITY, STATE & ZIP CODE)
BOX 152170
IRVING, TEXAS 75015

PREPARED BY:	PRODUCT CODE NUMBER	EMERGENCY TELEPHONE NUMBER
C KERINS/CHEMIST	1740	214-438-1381

SECTION II- HAZARDOUS INGREDIENTS

THE HAZARDS PRESENTED BELOW ARE THOSE OF THE INDIVIDUAL COMPONENTS.

```
CHEMICAL NAME (INGREDIENTS) :
D-LIMONENE
      HAZARD----->COMB/IRR.   | TLV--->50 PPM     | PEL-->N/E     2. |
      STEL(TWA)- ->N/E        | CAS#--->5989-27-5 |
-------------------------------------------------------------------------
CHEMICAL NAME (INGREDIENTS) :
HEXYLENE GLYCOL
      HAZARD----->IRR.        | TLV--->25 PPM     | PEL-->N/E     2. |
      STEL(TWA)- ->N/E        | CAS#--->107-41-5  |
-------------------------------------------------------------------------
CHEMICAL NAME (INGREDIENTS) :
DIETHANOLAMINE SALT OF TALL OIL FATTY ACID
      HAZARD----->IRR.        | TLV--->N/E        | PEL-->N/E     2. |
      STEL(TWA)- ->N/E        | CAS#--->61790-66-7 |
-------------------------------------------------------------------------
CHEMICAL NAME (INGREDIENTS) :
TRIETHANOLAMINE SALT OF TALL OIL FATTY ACID
      HAZARD----->IRR.        | TLV--->N/E        | PEL-->N/E     2. |
      STEL(TWA)- ->N/E        | CAS#--->68132-46-7 |
-------------------------------------------------------------------------
```

[illegible]

SECTION IIA - NON-HAZARDOUS INGREDIENTS

NON-HAZARDOUS INGREDIENT NAMES AND CAS NUMBERS ARE PROTECTED UNDER NJ TRADE SECRET REGISTRY # --409353-5009P

SECTION III - PHYSICAL DATA

BOILING PT.(FAHRENHEIT)	378:F	SPEC GRAVITY (H2O=1)	0.95
VAPOR PRESSURE (MM HG).	5	COLOR	ORANGE
VAPOR DENSITY (AIR=1)	5	ODOR	ORANGE
PH @ 100%	@10%=8.5	CLARITY	TRANSPARENT
PERCENT VOLATILE BY VOLUME (%)	80	EVAPORATION RATE (BU AC = 1)	0.01
SOLUBILITY IN WATER	EMULSION		
VISCOSITY	SEMI-VISCOUS		

SECTION IV - FIRE AND EXPLOSION HAZARD

FLASH POINT (METHOD USED)	FLAMMABLE LIMITS	LEL	UEL
119:F T.C.C.	D-LIMONENE	0.7	6.1

EXTINGUISHING MEDIA
X<--FOAM   X<--"ALCOHOL" FOAM   X<--CO2   X<--DRY CHEMICAL   <--WATER SPRAY   <--OTHER

SPECIAL FIRE FIGHTING PROCEDURES
FIREFIGHERS SHOULD WEAR PROPER PROTECTIVE EQUIPEMENT AND SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE IN THE POSITIVE PRESSURE MODE.

UNUSUAL FIRE & EXPLOSION HAZARDS
BURNING MAY PRODUCE OXIDES OF CARBON,SULFUR,AND NITROGEN.VAPORS ARE HEAVIER THAN AIR AND MAY TRAVEL TO DISTANT IGNITION SOURCES AND FLASHBACK. DO NOT SPRAY A DIRECT STREAM OF WATER INTO PRODUCT AS FROTHING MAY OCCUR.

NFPA HAZARD RATING (0=INSIGNIFICANT;1=SLIGHT;2=MODERATE;3=HIGH;4=EXTREME):
1 <--HEALTH   2 <--FLAMMABILITY   [illegible] <--REACTIVITY   <--SPECIAL

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THRESHOLD LIMIT VALUE :

NOT ESTABLISHED FOR MIXTURE. SEE SECTION II.

EFFECTS OF OVEREXPOSURE

- ACUTE - (SHORT TERM EXPOSURE)

<>EYE CONTACT: CAUSES IRRITATION, REDNESS, TEARING, SEVERE DISCOMFORT, AND POSSIBLE CORNEAL INJURY.<>

-SKIN CONTACT: MAY CAUSE IRRITATION SEEN AS REDNESS, ITCHING, AND SWELLING. MAY CAUSE AN ALLERGIC SKIN REACTION.-

- INGESTION: MAY CAUSE IRRITATION OF MOUTH AND THROAT, ABDOMINAL PAIN, NAUSEA, DIZZINESS, AND LOSS OF CONSCIOUSNESS. INGESTION AND SUBSEQUENT VOMITING OF THIS PRODUCT CAN LEAD TO ASPIRATION OF THE PRODUCT INTO THE LUNGS WHICH CAN LEAD CHEMICAL PNEUMONITIS AND MAY BE FATAL.

INHALATION: MAY CAUSE IRRITATION OF THE RESPIRATORY TRACT SEEN AS COUGHING AND SNEEZING. MAY CAUSE ALLERGIC REPIRATORY REACTION IF INHALED.

- CHRONIC - (LONG TERM EXPOSURE)

MAY AGGRAVATE EXISTING SKIN AND RESPIRATORY CONDITIONS.
*TARGET ORGANS: NONE KNOWN.
REPEATED EXPOSURE TO THIS PRODUCT MAY PRODUCE SKIN AND RESPIRATORY SENSITIZATION.

PRIMARY ROUTE OF ENTRY: <-- INHALATION <-- INGESTION X<-- ABSORPTION

EMERGENCY & FIRST AID PROCEDURES

INHALATION :
REMOVE FROM THE AREA TO FRESH AIR. SEEK MEDICAL ATTENTION IF RESPIRATORY IRRITATION DEVELOPS OR IF BREATHING BECOMES DIFFICULT.

EYE CONTACT:
IMMEDIATELY RINSE THE EYES WITH WATER. REMOVE ANY CONTACT LENSES AND CONTINUE FLUSHING FOR AT LEAST 15 MINUTES. HOLD THE EYELIDS APART TO ENSURE RINSING OF THE ENTIRE SURFACE OF THE EYES AND LIDS WITH WATER. GET IMMEDIATE MEDICAL ATTENTION.

SKIN CONTACT:
WASH AFFECTED AREAS WITH PLENTY OF SOAP AND WATER FOR SEVERAL MINUTES. REMOVE AND CLEAN CONTAMINATED CLOTHING AND SHOES. SEEK MEDICAL ATTENTION IF IRRITATION DEVELOPS.

INGESTION :
GIVE 3 TO 4 GLASSES OF WATER, BUT DO NOT INDUCE VOMITING. IF VOMITING OCCURS, GIVE FLUIDS AGAIN. GET IMMEDIATE MEDICAL ATTENTION IF DISCOMFORT.

NOTES TO PHYSICIAN :

SECTION VI - TOXICITY INFORMATION

PRODUCT CONTAINS CHEMICAL LISTED AS CARCINOGEN OR POTENTIAL CARCINOGEN BY:

IARC	NTP	OSHA	ACGIH	OTHER
<--YES X<--NO	<--YES X<--NO	<--YES X<--NO	<--YES X<--NO	<--YES X<--NO

D-LIMONENE :
ORL-RAT LD50: 4400 MG/KG 3.
ORL-MUS LD50: 5600 MG/KG 3.
IPR-RAT LD50: 3600 MG/KG 3.
IVN-RAT LD50: 110 MG/KG 3.
DIETHANOLAMINE SALT OF TALL OIL FATTY ACID: NO DATA FOUND.
TRIETHANOLAMINE SALT OF TALL OIL FATTY ACID: NO DATA FOUND.
HEXYLENE GLYCOL:
SKN-RBT LD50: 8560 MG/KG 3.
ORL-RAT LD50: 3700 MG/KG 3.
IPR-RAT LDLO: 1500 MG/KG 3.
EYE-RBT 93 MG SEV 3.
SKN-RBT 500 MG/24H MODERATE 3.
SKN-RBT 465 MG OPEN MILD 3.

SECTION VII - REACTIVITY DATA

STABILITY	X<--STABLE <--UNSTABL	CONDITIONS TO AVOID
	AVOID HEAT, HOT SURFACES, SPARKS AND OPEN FLAMES.	

INCOMPATIBILITY (MATERIALS TO AVOID)
OXIDIZING AGENTS, REDUCING AGENTS, STRONG ACIDS AND BASES.
IODINE PENTAFLUOROETHYLENE CONTACT CAN BE EXPLOSIVE.

HAZARDOUS DECOMPOSITION PRODUCTS
OXIDES OF CARBON AND NITROGEN.

HAZARDOUS	WILL NOT X <--OCCUR	MAY <--OCCUR	CONDITIONS TO AVOID
POLYMERIZATION	NONE KNOWN.		

SECTION VIII - SPILL OR LEAK PROCEDURES

STEPS TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
REMOVE ALL SOURCES OF IGNITION. DIKE AND CONTAIN SPILL. ABSORB WITH AN INERT MATERIAL AND SWEEP, SCOOP, OR SHOVEL MATERIAL INTO A PROPERLY LABELED CONTAINER FOR DISPOSAL. CAUTION: SPILL CAN MAKE FLOOR SLIPPERY.

WASTE DISPOSAL METHOD
DISPOSE OF IN ACCORDANCE WITH ALL FEDERAL, STATE AND LOCAL REGULATIONS.

NEUTRALIZING AGENT
NONE KNOWN.

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SECTION IX - SPECIAL PROTECTION INFORMATIO

REQUIRED VENTILATION
GENERAL EXHAUST IS USUALLY ADEQUATE TO PREVENT AIRBORNE CONCENTRATIONS FROM EXCEEDING THE RECOMMENDED EXPOSURE LIMITS. IF THESE RECOMMENDED LIMITS ARE OR MAY BE EXCEEDED WHEN GENERAL EXHAUST IS USED, THEN LOCAL MECHANICAL EXHAUST WILL BE NECESSARY.

RESPIRATORY PROTECTION
A NIOSH/MSHA APPROVED RESPIRATOR IN POORLY VENTILATED AREAS AND/OR FOR EXPOSURE ABOVE THE ACGIH TLV OR OSHA PEL.

PROTECTIVE GLOVES
NEOPRENE FOR REPEATED OR PROLONGED CONTACT.

EYE PROTECTION
WEAR SAFETY GLASSES IF THE METHOD OF APPLICATION PRESENTS THE LIKELIHOOD OF EYE CONTACT.

OTHER PROTECTION
WEAR GENERAL DUTY WORK CLOTHING AND SHOES.
HAVE A SAFETY SHOWER AND EYE STATION IN WORK AREA

SECTION X - STORAGE AND HANDLING INFORMATION

STORAGE TEMPERATURE	INDOOR	HEATED	REFRIGERATED	OUTDOOR
100: F<--MAX 35: F<--MIN	X			

PRECAUTIONS TO BE TAKEN IN HANDLING & STORING
KEEP AWAY FROM HEAT AND FLAME.
KEEP CONTAINERS TIGHTLY CLOSED WHEN NOT IN USE.
ALL HANDLING EQUIPMENT AND DRUM SHOULD BE PROPERLY GROUNDED. DO NOT CUT WELD, BRAZE, OR SOLDER EVEN EMPTY CONTAINERS AS THEY MAY CONTAIN PRODUCT RESIDUE WHICH IS COMBUSTIBLE.

OTHER PRECAUTIONS
FOLLOW LABEL DIRECTIONS.
KEEP OUT OF REACH OF CHILDREN.
READ ENTIRE LABEL BEFORE USING PRODUCT.
AVOID EYE CONTACT AND EXCESSIVE BREATHING OF VAPORS.

SECTION XI - REGULATORY INFORMATION

CHEMICAL NAME	C.A.S. NUMBER	UPPER % LIMIT
N/A		

(CONTINUED) SECTION XI - REGULATORY INFORMATION

THOSE INGREDIENTS LISTED ABOVE ARE SUBJECT TO THE REPORTING REQUIREMENTS OF 313 OF TITLE III OF THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 AND 40 CFR PART 372.

IF UE (USE EXEMPTION) APPEARS UNDER UPPER % LIMIT, END USERS ARE EXEMPT FROM NOTIFICATION BECAUSE THE PRODUCT IS USED AND LABELED FOR ROUTINE JANITORIAL WORK, OR THE PRODUCT IS USED AND LABELED FOR FACILITY GROUNDS MAINTENANCE (SUCH AS FERTILIZERS AND HERBICIDES), OR THE PRODUCT IS USED AND LABELED FOR MAINTAINING MOTOR VEHICLES.

CALIFORNIA PROPOSITION 65

WARNING: THIS PRODUCT CONTAINS THE FOLLOWING CHEMICAL(S) KNOWN TO THE STATE OF CALIFORNIA TO CAUSE (1) CANCER OR (2) BIRTH DEFECTS OR OTHER REPRODUCTIVE HARM: NITRILOTRIACETIC ACID (1) AND ETHANOL (2) AS TRACE CONTAMINANTS.

SECTION XII - TRANSPORTATION - (FOR FUTURE USE)

APPLICABLE REGULATIONS
<--49 CFR <--IMCO <--TARIFF 6 D <--IATA <--MILITARY AIR (AFR 71-4)

SHIPPING NAME

HAZARD CLASS | ID NUMBER | REPORT QTY

LABELS | LIMITED QTY

UNIT CONTAINER

DOT SPS CONTAINER | NET EXPLOSIVE WT.

AEROSOL PROPELLANT(S)

SECTION XIII - REFERENCES

1. THRESHOLD LIMIT VALUES FOR CHEMICAL SUBSTANCES AND PHYSICAL AGENTS AND BIOLOGICAL EXPOSURE INDICES, ACGIH, 1994-1995.
2. OSHA PEL.
3. SAX'S DANGEROUS PROPERTIES OF INDUSTRIAL MATERIALS, 8TH EDITION, RICHARD J. LEWIS, SR.

*SHORT TERM EXPOSURE LIMIT (TWA) LISTED AS FINAL RULE LIMITS PUBLISHED IN THE FEDERAL REGISTER/VOL.54 NO.12, 1-19-89

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THE INFORMATION CONTAINED HEREIN IS BASED ON DATA CONSIDERED ACCURATE IN LIGHT OF CURRENT FORMULATION. HOWEVER, NO WARRANTY IS EXPRESSED OR IMPLIED REGARDING THE ACCURACY OF THIS DATA OR THE RESULTS TO BE OBTAINED FROM THE USE THEREOF.

MANTEK, DIVISION OF NCH CORP. ASSUMES NO RESPONSIBILITY FOR PERSONAL INJURY OR PROPERTY DAMAGE CAUSED BY THE USE, STORAGE OR DISPOSAL OF THE PRODUCT IN A MANNER NOT RECOMMENDED ON THE PRODUCT LABEL. USERS ASSUME ALL RISKS ASSOCIATED WITH SUCH UNRECOMMENDED USE, STORAGE, OR DISPOSAL OF THE PRODUCT.

CARGILL SALT

MATERIAL SAFETY DATA SHEET

I. GENERAL INFORMATION

TRADE NAME (COMMON NAME OR SYNONYM) Salt			C.A.S. NO(S) 7647-14-5
CHEMICAL NAME(S) Sodium Chloride		FORMULA NaCl	MOLECULAR WEIGHT 58.44
MANUFACTURER(S) NAME AND ADDRESS Cargill Incorporated - Salt Division P.O. Box 5621 Minneapolis, MN 55440			GSA National Stock Numbe (General Services Admin. 6810-00-227-0437
CONTACT Director-Quality Admin.	PHONE NO. (612) 742-6581	DATE ISSUED 3/1/85	DATE REVISE 4/28/93

II. HAZARDOUS INGREDIENTS/IDENTITY INFORMATION

Hazardous Components (Specific Chemical Identity; and/or Common Name(s))	OSHA PEL	ACGIH TLV	Other Limits Recommended	Percent (Optiona
None				
THIS PRODUCT IS NOT REGULATED UNDER: - OSHA Hazard Communication Standard 29 CFR 1910.1200 - S.A.R.A. Title III				

III. PHYSICAL/CHEMICAL CHARACTERISTICS

BOILING POINT (760mm Hg) (°C)	1465	SPECIFIC GRAVITY (H_2O=1)	2.16
VAPOR PRESSURE (mm Hg/747°C)	2.4	MELTING POINT (°C)	801
VAPOR DENSITY (Air=1)	NA	EVAPORATION RATE (Butyl Acetate=1)	NA
SOLUBILITY IN WATER (g/cc, %)	26.4		

APPEARANCE AND ODOR White crystalline solid with slight halogen odor.

SALT-326 (REV. 4/93)

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IV. FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used) Not Applicable.	FLAMMABLE LIMITS	
	LEL NA	UEL NA

EXTINGUISHING MEDIA Not Applicable. This product is nonflammable.
SPECIAL FIRE-FIGHTING PROCEDURES/EQUIPMENT Not Applicable.
UNUSUAL FIRE AND EXPLOSION HAZARDS None

V. REACTIVITY DATA

STABILITY		
Stable	X	Conditions To Avoid: Contact with strong acids.
Unstable		

INCOMPATABILITY (Materials to Avoid) Becomes corrosive to metals when wet.
HAZARDOUS DECOMPOSITION OR BYPRODUCTS: May evolve chlorine gas when in contact with strong acids.

HAZARDOUS POLYMERIZATION		
May Occur		Conditions To Avoid: Not Applicable.
Will Not Occur	X	

VI. HEALTH HAZARD DATA

ROUTE(S) OF ENTRY
Inhalation? May cause mild irritation of nose and throat.
Skin? Dust may cause mild irritation.
Ingestion? Ingestion of large amounts may cause gastrointestinal upset.

HEALTH HAZARDS (Acute And Chronic) Ingestion of large amounts (greater than 0.1 pound) can cause gastrointestinal upset and irritation of the stomach. No applicable information found for chronic systemic effects.

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VI. HEALTH HAZARD DATA (Continued)

CARCINOGENICITY

NTP? Not listed as a carcinogen or mutagen.

IARC Monographs? Not listed as a carcinogen or mutagen.

OSHA Regulated? Not listed as a carcinogen or mutagen.

SIGNS AND SYMPTOMS OF EXPOSURE

Inhalation: Slight irritation of the nose; sneezing.

Skin Contact: Irritation; inflammation.

Ingestion: Nausea; vomiting.

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE

In some cases of confirmed hypertension, ingestion may result in elevated blood pressure. (This applies only to salt-sensitive individuals.)

EMERGENCY AND FIRST AID PROCEDURES

Inhalation: If person breathes large quantities, remove to fresh air at once. If breathing stops, apply artificial respiration immediately.

Skin Contact: Remove clothing from affected area. Wash skin thoroughly. Rinse carefully. For eye contact, flush with water immediately, lifting eyelids occasionally.

Ingestion: Less than a few grams would not be harmful. For larger quantities, drink large amounts of water or milk.

EMERGENCY TELEPHONE NUMBERS Daytime (612) 742-5531
Evenings (612) 476-1127

VII. PRECAUTIONS FOR SAFE HANDLING AND USE

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Contain spills to prevent contamination of water supply or sanitary sewer system. Vacuum or sweep into containers for proper disposal.

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VII. PRECAUTIONS FOR SAFE HANDLING AND USE (Continued)

WASTE DISPOSAL METHOD
For disposal of this material as a waste, act in accordance with all applicable Federal, state, and local waste management regulations.

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE
Avoid humid or wet conditions as product will cake and become hard.

OTHER PRECAUTIONS Not Applicable.

VIII. CONTROL MEASURES

RESPIRATORY PROTECTION (Specify Type)
NIOSH/MSHA approved respirator for particulates.

VENTILATION	Local Exhaust Ventilate as required to maintain airborne particulates below occupational exposure limits.
	Mechanical (General) Dust collection equipment may be employed.
	Special/Other not applicable.

PERSONAL PROTECTIVE EQUIPMENT

Protective Gloves Normal work gloves are adequate.

Eye Protection Eyeglasses or goggles should be worn in dusty areas.

Other Protective Clothing Or Equipment Protective clothing may be worn in dusty areas, but is generally not required.

Work/Hygiene Practices Warm water showering and handwashing is suggested after working in extremely dusty areas.

All statements, technical information and recommendations contained herein are, to the best of our knowledge, reliable and accurate; however, no warranty, either express or implied, is made with respect thereto, nor will any liability be assumed for damages resultant from the use of the material described.

It is the responsibility of the user to comply with all applicable federal, state, and local laws and regulations. It is also the responsibility of the user to maintain a safe workplace. The user should consider the health hazards and safety information provided herein as a guide and should take the necessary steps to instruct employees and to develop work practice procedures to ensure a safe work environment.

This information is not intended as a license to operate under, or a recommendation to practice or infringe upon any patent of this Company or others covering any process, composition of matter or use.

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NALCO

MATERIAL SAFETY DATA SHEET

PRODUCT
SOLUTION S0636 PA-2

Emergency Telephone Number
Medical (800) 452-5378 (24 hours) (800) I-M-ALERT

SECTION 1 PRODUCT IDENTIFICATION

TRADE NAME: SOLUTION S0636 PA-2
DESCRIPTION: PA-2, very dilute aqueous solution of a quaternary amine

NFPA 704M/HMIS RATING: 0/0 HEALTH 0/0 FLAMMABILITY 0/0 REACTIVITY 0 OTHER
0=Insignificant 1=Slight 2=Moderate 3=High 4=Extreme

SECTION 2 HAZARDOUS INGREDIENTS

Our hazard evaluation of the ingredient(s) under OSHA's Hazard Communication Rule, 29 CFR 1910.1200 has found none of the ingredient(s) hazardous.

SECTION 3 PRECAUTIONARY LABEL INFORMATION

Do not take internally.

SECTION 4 FIRST AID INFORMATION

Flush contacted area with water.

SECTION 5 HEALTH EFFECTS INFORMATION

PRIMARY ROUTE(S) OF EXPOSURE: Eye, Skin

EYE CONTACT: Non-irritating.
SKIN CONTACT: Non-irritating.

SYMPTOMS OF EXPOSURE: A review of available data does not identify any symptoms from exposure not previously mentioned.

SECTION 6 TOXICOLOGY INFORMATION

TOXICITY STUDIES: No toxicity studies have been conducted on this product.

SECTION 7 PHYSICAL AND CHEMICAL PROPERTIES

COLOR: Colorless FORM: Liquid ODOR: Odorless
SOLUBILITY IN WATER: Completely
SPECIFIC GRAVITY: 1.0 ASTM D-1298
pH (NEAT) = Neutral ASTM E-70
FLASH POINT: None

NOTE: These physical properties are typical values for this product.

SECTION 8 FIRE AND EXPLOSION INFORMATION

FLASH POINT: None

EXTINGUISHING MEDIA: Not applicable

UNUSUAL FIRE AND EXPLOSION HAZARD: None

SECTION 9 REACTIVITY INFORMATION

INCOMPATIBILITY: None known

THERMAL DECOMPOSITION PRODUCTS: Not applicable

SECTION 10 PERSONAL PROTECTION EQUIPMENT

RESPIRATORY PROTECTION: Respiratory protection is not needed.

VENTILATION: General ventilation is recommended.

PROTECTIVE EQUIPMENT: Safety glasses should be worn when handling any liquid product.

SECTION 11 SPILL AND DISPOSAL INFORMATION

IN CASE OF TRANSPORTATION ACCIDENTS, CALL THE FOLLOWING 24-HOUR TELEPHONE NUMBER (800) I-M-ALERT or (800) 462-5378.

SPILL CONTROL AND RECOVERY:

Flush to laboratory drain or sewer with water.

DISPOSAL: If this product becomes a waste, it does not meet the criteria of a hazardous waste as defined under the Resource Conservation and Recovery Act (RCRA) 40 CFR 261, since it does not have the characteristics of Subpart C, nor is it listed under Subpart D.

Flush to laboratory drain or sanitary sewer with water.

SECTION 12 ENVIRONMENTAL INFORMATION

If released into the environment, see CERCLA in Section 14.

SECTION 13 TRANSPORTATION INFORMATION

PROPER SHIPPING NAME/HAZARD CLASS MAY VARY BY PACKAGING, PROPERTIES,

SECTION 14 REGULATORY INFORMATION (CONTINUED)

Consult Section 11 for RCRA classification.

FEDERAL WATER POLLUTION CONTROL ACT, CLEAN WATER ACT, 40 CFR 401.15 (formerly Sec. 307), 40 CFR 116 (formerly Sec. 311):
None of the ingredients are specifically listed.

CLEAN AIR ACT, Sec. 111 (40 CFR 60), Sec. 112 (40 CFR 61, 1990 Amendments), Sec. 611 (40 CFR 82, CLASS I and II Ozone depleting substances):
This product does not contain ingredients covered by the Clean Air Act.

STATE REGULATIONS:

CALIFORNIA PROPOSITION 65:
This product does not contain any chemicals which require warning under California Proposition 65.

MICHIGAN CRITICAL MATERIALS:
This product does not contain ingredients listed on the Michigan Critical Materials Register.

STATE RIGHT TO KNOW LAWS:
This product does not contain ingredients listed by State Right To Know Laws.

SECTION 15 ADDITIONAL INFORMATION

None

SECTION 16 USER'S RESPONSIBILITY

This product material safety data sheet provides health and safety information. The product is to be used in applications consistent with our product literature. Individuals handling this product should be informed of the recommended safety precautions and should have access to this information. For any other uses, exposures should be evaluated so that appropriate handling practices and training programs can be established to ensure safe workplace operations. Please consult your local sales representative for any further information.

SECTION 17 BIBLIOGRAPHY

ANNUAL REPORT ON CARCINOGENS, U.S. Department of Health and Human Services, Public Health Service, PB 83-135855, 1983.

CASARETT AND DOULL'S TOXICOLOGY, THE BASIC SCIENCE OF POISONS, Doull, J.,

SECTION 13 TRANSPORTATION INFORMATION (CONTINUED)

AND MODE OF TRANSPORTATION. TYPICAL PROPER SHIPPING NAMES FOR THIS PRODUCT ARE:

ALL TRANSPORTATION MODES : PRODUCT IS NOT REGULATED
DURING TRANSPORTATION

SECTION 14 REGULATORY INFORMATION

The following regulations apply to this product.

FEDERAL REGULATIONS:

OSHA'S HAZARD COMMUNICATION RULE, 29 CFR 1910.1200:
Based on our hazard evaluation, none of the ingredients in this product are hazardous.

CERCLA/SUPERFUND, 40 CFR 117, 302:
Notification of spills of this product is not required.

SARA/SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (TITLE III) - SECTIONS 302, 311, 312 AND 313:

SECTION 302 - EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355):
This product does not contain ingredients listed in Appendix A and B as an Extremely Hazardous Substance.

SECTIONS 311 and 312 - MATERIAL SAFETY DATA SHEET REQUIREMENTS (40 CFR 370):
Our hazard evaluation has found that this product is not hazardous under 29 CFR 1910.1200.

Under SARA 311 and 312, the EPA has established threshold quantities for the reporting of hazardous chemicals. The current thresholds are: 500 pounds or the threshold planning quantity (TPQ), whichever is lower, for extremely hazardous substances and 10,000 pounds for all other hazardous chemicals.

SECTION 313 - LIST OF TOXIC CHEMICALS (40 CFR 372):
This product does not contain ingredients on the List of Toxic Chemicals.

TOXIC SUBSTANCES CONTROL ACT (TSCA):
The chemical ingredients in this product are on the 8(b) Inventory List (40 CFR 710).

RESOURCE CONSERVATION AND RECOVERY ACT (RCRA), 40 CFR 261 SUBPART C & D:

SECTION 17 BIBLIOGRAPHY (CONTINUED)

Klaassen, C. D., and Admur, M. O., eds., Macmillian Publishing Company, Inc., N. Y., 2nd edition, 1980.

CHEMICAL HAZARDS OF THE WORKPLACE, Proctor, N. H., and Hughes, J. P., eds., J. P. Lipincott Company, N.Y., 1981.

DANGEROUS PROPERTIES OF INDUSTRIAL MATERIALS, Sax, N. Irving, ed., Van Nostrand Reinhold Company, N.Y., 6th edition, 1984.

IARC MONOGRAPHS ON THE EVALUATION OF THE CARCINOGENIC RISK OF CHEMICALS TO MAN, Geneva: World Health Organization, International Agency for Research on Cancer, 1972-1977.

PATTY'S INDUSTRIAL HYGIENE AND TOXICOLOGY, Clayton, G. D., Clayton, F. E., eds., John Wiley and Sons, N. Y., 3rd edition, Vol. 2 A-C, 1981.

REGISTRY OF TOXIC EFFECTS ON CHEMICAL SUBSTANCES, U.S. Department of Health and Human Services, Public Health Service, Center for Disease Control, National Institute for Occupational Safety and Health, 1983 supplement of 1981-1982 edition, Vol. 1-3, OH, 1984.

Title 29 Code of Federal Regulations Part 1910, Subpart Z, Toxic and Hazardous Substances, Occupational Safety and Health Administration (OSHA).

THRESHOLD LIMIT VALUES FOR CHEMICAL SUBSTANCES AND PHYSICAL AGENTS IN THE WORKROOM ENVIRONMENT WITH INTENDED CHANGES, American Conference of Governmental Industrial Hygienists, OH.

Information on this MSDS has changed. The changes are indicated by asterisks on the right side of only the changed sections. This is an updated MSDS as required by OHSA's Hazard Communication Rule 29 CFR 1910.1200.

PREPARED BY: Ricky A. Stackhouse PhD., Toxicologist
DATE CHANGED: 06/28/95 DATE PRINTED: 07/01/95

NALCO

MATERIAL SAFETY DATA SHEET

PRODUCT

Emergency Telephone Number

Medical (800) 462-5378 (24 hours) (800) I-M-ALERT

Activity 1 - Reading Comprehension

Objective (s): This activity will enable participants

1. To practice reading and applying information.

Directions: Read the paragraph below and answer the questions. You may refer back to the paragraph.

The Environmental Protection Agency has particular standards for pesticide application in and around food manufacturing plants. Specific employees are trained in the principles of applying pesticides safely for man and the environment. They are taught about application equipment, methods of application and the basic of insecticides, rodenticides, and avicides. Insecticides are used to kill insects. Rodenticides kill rodents such as field mice and avicides are pesticides used to control birds. These employees are required to be certified in compliance with EPA's Standards of Certification. The certification exam is administered by the Virginia Department of Agriculture and Consumer Services. At Nabisco, the employees who are certified to conduct pesticide application are called Utility Technicians.

Utility Technicians are aware of the pests that are associated with food manufacturing plants. Some of those pests include birds, weeds, rodents, and insects. The type and pests most likely to occur will depend on both the geographical location of the food manufacturing plant and the type of food being processed. These pests are able to damage, destroy, and contaminate. They must be controlled to protect the quality of the Nabisco's product. If quality is not maintained, federal and state agencies have authority to seize food products or take other action.

Questions:

1. What would you say would be an appropriate theme for the paragraph above?____
____

2. What are the three kinds of pests that plague food manufacturing facilities?______________________________

3. The kind of pests that are associated with a manufacturing plant depends upon the location of the plant and what country it is located in? Check one: True ____ False____

4. What action can the state or federal agency take if food products are contaminated?______________________________

5. What can pests do to food manufacturing plants products?
____

6. The individuals at Nabsico that are certified to conduct pesticide control are called (circle one) : a. Pesticide Agents
b. Utility Technicians c. Pesticide Applicants

7. Name three areas of training for those who apply pesticides in food manufacturing plants________________________________
____

8. What kind of pesticide is used to control birds in a pest situation?__________________________________

9. Rodenticides are used to control insects? True____ False____

Activity 2 - Reading Comprehension - Pesticide Control

Objective: This activity will enable participants

1. To practice reading and applying information

Directions: Read the paragraph below and answer the questions.

Understanding Pesticide Control for Birds

There are many species of birds in the United States, but only three are considered pests around food manufacturing plants. They are the English Sparrows (sometimes called the House Sparrows), Pigeons, and Starlings. Since these birds live in such close proximity to man, one would wonder how they can be such a pest.

They are considered pests in a manufacturing situation because their droppings can contaminate food products. Simply put, they can spread diseases. Their droppings have been known to plug gutters, cause roofs to leak, and they carry mites that can bite people.

Pesticide technicians can contain these birds in three ways: (1) setting traps (2) shooting them (3) using avicides or other pesticides to control them.

Questions:

1. What are three ways Utility Technicians can control birds?
   ____________________, ________________, _________________________
2. What is a common name for the English Sparrow?_______________
3. Why are birds considered pests?_________________________________

Activity 3 - Reading Comprehension--Pesticide Control

Objective: This activity will enable participants

1. To practice reading and applying information.

Directions: Read the descriptions below and answer the questions. Identify the pests described in the statements by filling in the blank with the correct letter.

A. **English Sparrow**
Grayish in color
3-4 inches long
Male has a black throat and small conical beak
Has an non-musical chirp and a creamy white egg

B. **Pigeons**
Varied colors
6-10 inches long
Fan shaped tail on take-off and landing
Head bobs and beak pointed down when walking
Voice is long, soft coo-oo-o
White eggs

C. **Starlings**
Body and wings gold-flecked
Large spear-like bills that are yellow or olive
Compact, short bodies, 4-7 inches long
Bluish green eggs

D. **House Mouse (Mus Muscualus)**
Weighs 1/2 to 3/4 oz.
Small head an body
Fur, silky, dusky gray

E. **Norway Rate (Rattus Norvegicus)**
Weights 10-17 oz.
Blunt Muzzle head, heavy thick body
Fur, coarse, normally red-brown
to gray brown

F. **Roof Rat (Rattus rattus)**
Weighs 8-12 oz.
Pointed Muzzle head, slender body
Fur, black and slate gray, tawny above,
gray white-below, tawny above, white to
lemon belly

G. **German Cockroach**
Most common and widespread
Small, about 3/4" long
Yellowish brown with two dark-brown stripes
behind head

H. **American Cockraoch**
Largest in the U.S.
Adults grow to 2"
Adults color is brown, the young
pale brown

Questions:

1. Common name is a House Sparrow?____
2. Bobs head when walking?_____
3. Has bluish green eggs?____
4. Most common cockroach?____
5. Has silky, dusty gray fur?____
6. Weighs 10 to 17 oz. and is a rodent?____
7. Grows up to 2" as an adult insect?____
8. Has a pointed muzzle head and a slender body?____

Activity 4 - Following Directions Drawing

Objective - To have participants practice reading comprehension skills.

Directions - 1. Use a blank sheet of paper and follow the written directions below.

a. Draw a triangle with sides of equal length in the upper right corner.

b. In the center draw a square about an inch on each side.

c. Draw an arrow from the triangle to the square.

d. Below the square draw five lines, one below the other, each the same length as the side of the square.

e. Draw a circle in the lower left corner.

f. Make a dotted line from the circle to the second line below the square.

g. If the square is below the circle, color in the triangle.

h. If an even number of the lines below the square are not connected to any of the figures, place an X in the square.

Activity 5 - Reading Comprehension - Pesticide Control

Objective: This activity will enable participants

1. To practice reading and applying information.

Directions: Read the paragraph and answer the questions.

The First Step, Know Your Common Pests

The first step in investigating and solving your pest problem is to determine the species of the pests that is troubling your operation. We understand that there are different nationalities of people. Well, the same is true for pests. Pest control programs have to be designed to target specific pests. The rule of thumb is to fit the pesticide to the pest.

Questions:

1. What is the first step in solving your pest problem?______
____

2. What is the rule of thumb in designing pest control programs?____
____

3. General pest control programs are the most effective?
True____ False_____

Activity 6 - Reading Comprehension - Pesticide Control

Objective: This activity will enable participants

1. To practice reading and applying information.

Directions: Read the pest descriptions below and answer the questions. Identify the pest described by the statement by filling in the blank with the correct letter.

A. Ants
Large head, elbowed antennae
Narrow waist, no wings

B. Bed Bugs
Small rounded, dark brown
No wings, may be engorged with blood

C. Bees
Light brown if honey bees
with a hairy body

D. Booklice
Minute, place colored body
No wings

E. Boxelder Bugs
Bright red and black
Long antennae
Narrow head with peak

F. Carpet Beetles
Adults, small rounded, brown
Larvae elongate, brown body with long brown hairs

G. Centipedes
One pair of legs per body
segment, long antennae

H. **Millipedes**
Two pair of legs per body segment
Short antennae

I. **Fleas**
Adults, very small, laterally compressed
No wings
Bloodsucking parasite of warm-blooded animals

J. **Clothes Moths**
Adults, very small, pale white
Wings pale white, without spots

K. **Silverfish**
Small, pale gray, elongate
Antennae long, tail with long spines

L. **Ticks**
Adults, brown to dark brown
Sometimes with white spots, eight legs
Blood sucking parasites of mammals

M. **Saw-Toothed Grain Beetle**
A pantry pest
Adults, small, dark brown
with small spines on body region behind
head, love to infest flour

N. **Indian Meal Moth**
A pantry pest
Adult, two colored wings, pale
gray and redish brown
Love all grain products

O. **House Mouse**
Adults have small eyes and small feet
Tail is as long as the body
Adults are 2 1/2 to 3 1/2 in head and
body length

P. **Moth Flies**
Adults, small,oval shaped
Wings pointed and covered with hairs,
body small and full of hair

Questions:

1. These pests love gain products of all kinds?____
2. They have small eyes and small feet, and long tails?____
3. They do not have wings, narrow waist, and large head?____
4. They are bright read and black, with narrow head and peak?____
5. They're light brown and produce honey?____
6. They have one pair of legs per body part?____
7. Their wings are pointed and they are covered with hairs?____
8. They are blood sucking parasites of mammals?____
9. They have three long spines?____
10. The adults are usually brown, small and rounded?____

Activity 7 -Reading Comprehension

Objective: This activity will enable participants

1. To practice reading and applying information.

Directions: Read the paragraph below about fumigation. Then answer the questions.

What and Why of Fumigation

Fumigation is the process of distributing the pesticide chemicals called fumigants as a gas through space and materials. Fumigants are in the gas phase at effective temperatures, as compared to smokes, fogs, and aerosols which are dispersions of very fine particles or droplets.

The fumigation process requires that safety precautions, special equipment and specific knowledge. That is why individuals who do fumigation are required to have special licenses or permits. Only experienced and certified applicators should conduct fumigation.

Many factors affect the use and effectiveness of fumigants. The developmental stage and activity of a targeted pest is important. For example, active adult insects are easier to kill than inactive hibernating adults. The amount of free and open space in the area to be fumigated, the temperature, and the proximity of the product, the kind of product, the location of the pest within the product, and the structures to be fumigated all affect dosage and exposure period.

Temperature is the most important factor influencing the action of a fumigant on a pest. The dosage and exposure periods vary for most fumigants with the temperature. A fumigant gas should be spread evenly and quickly throughout the space to be treated. Therefore, air movement and diffusion is important.

(continued next page)

Sorption of fumigants is the association of the fumigant with the material and/or the surface being fumigated thus removing part of the fumigant from the vapor state. Both absorption and adsorption are reduced at higher temperatures. Adsorption is usually greater with fumigants of higher molecular weights and low vapor pressures.

As the moisture content of a commodity increases, it becomes more difficult for the fumigant to penetrate it. Adequate moisture, is required for the generation of some fumigants, and with living plants may reduce injury.

The condition of the structure and type of construction must be considered. Fumigation in vacuum chambers provides increased efficiency. Other general characteristics of the fumigants are important such as molecular weight boiling point, water, solubility and flammability.

Questions:

1. What are the general characteristics of fumigants that must be considered?____

____

2. Is it more efficient to spray in vacuumed chambers?
Yes___ No____

4. The temperature is the most important element to consider when using fumigants. True____ False____

5. Fumigants are chemical gases. True____ False___

Reading Comprehension - Fumigation

Activity 8 -Reading Comprehension

Objective: This activity will enable participants

1. To practice reading and applying information.

Materials Needed: Pencil, Chart handout on Fumigants Properties

Directions: Read the chart about the essential properties of fumigants that are commonly used in insect control. Then answer the questions.

Questions:

1. Which formula is usually used as an ingredient of nonflammable mixtures?______________________________

2. Which fumigant may be phytotoxic. It is safe for use on seeds but not recommended for fresh fruit or vegetables?
   ____

3. What is the boiling point of Sulfuryl Fluoride?__________

4. Which fumigants are nonflammable?__________________________
   ____
   ____

5. What is the molecular weight of Chloropicrin?______________

6. Is Hydrocyanic acid gas soluble in water? Yes____ No____

ESSENTIAL PROPERTIES OF FUMIGANTS

Name and Formula	Molecular Weight	Boiling Point (°C. at 760 mm. pressure)	Solubility in Water (g./100 ml.)
Acrylonitrile	53.06	77.0	7.5 at 25° C.
Carbon disulphide	76.13	46.3	0.22 at 22° C.
Carbon tetrachloride	153.84	77.0	0.08 at 20° C.
Chloropicrin	164.39	112.0	Insoluble at 20° C.
Ethylene dibromide	187.88	131.0	0.43 at 30° C.
Ethylene dichloride	98.97	83.0	0.87 at 20° C.
Ethylene oxide	44.05	10.7	Very soluble at 20° C.
Hydrocyanic acid gas	27.03	26.0	Very soluble at 20° C.
Methyl bromide	94.95	3.6	1.3 at 25° C.
Phosphine	34.04	-87.4	Very slightly soluble
Sulfuryl fluoride	102.06	-55.2	0.075 at 25° C.

1/ From Monro, Manual of Fumigation for Insect Control.

IN COMMON USE FOR INSECT CONTROL[1/]

Flammability (% by volume in air)	Commodities Treated and Remarks (Check labels for specific uses)
3-17	Tobacco and plant products; also for "spot" treatment. Injures growing plants, fresh fruits, and vegetables. Marketed with carbon tetrachloride.
1.25-44	Grain. Usually as ingredient of nonflammable mixtures.
Nonflammable	Only weakly insecticidal. Used chiefly in mixture with flammable compounds in grain fumigation to reduce fire hazard and aid distribution.
Nonflammable	Grains and plant products. Safe with seeds; injurious to living plants, fruit, and vegetables. Highly irritating lachrymator. Bactericidal and fungicidal.
Nonflammable	General fumigant. Particularly useful for certain fruit; may injure growing plants.
6-16	Seeds and grains. Usually mixed with carbon tetrachloride.
3-80	Grains, cereals, and certain plant products. Toxic at practical concentrations to many bacteria, fungi, and viruses. Strongly phytotoxic and affects seed germination.
6-41	General fumigant, but may be phytotoxic. Safe on seeds but not recommended for fresh fruit and vegetables.
Nonflammable	General fumigant. May be used with caution for nursery stock, growing plants, some fruit, and seeds of low moisture content.
Highly flammable	Grain fumigant; gas generated from tablets of aluminum phosphide.
Nonflammable	Wood destroying and household insects, but not for food or drug products. Phytotoxic but little effect on seed germination.

Betty just arrived home late from work and has to prepare a dessert to take to a PTA function tonight. She has only one hour to prepare the dessert and get to the school.

These are the items Betty has available to her:

5 lb. bag sugar
1 box salt
1 dozen eggs
1 qt. milk
2 lb. bag flour

pie crust mix
1 bottle vanilla extract
1 can cream of tartar
one large lemon
1 can cinnamon

1/2 lb. margarine
lemon extract
1/2 box of Nilla Wafers
1/3 box of Ritz crackers
1/2 dozen bananas

Read the recipes and the labels on the following pages and answer the following questions.

1. Does Betty have all the ingredients she needs to make each one of these desserts?

2. Does Betty have the right quantity of the ingredients that she needs to make each of these desserts?

3. Which recipe would require the most time to prepare?

4. What ingredients do the two recipes have in common?

5. According to the label, how many cookies are in the Nilla Wafers box?

6. According to the label, how many crackers are in the Ritz box ?

7. Which of the two desserts do you think Betty should make and why ?

NABISCO
Nilla
WAFERS
NET WT 12 OZ (340g)

NABISCO

Nilla
WAFERS

ORIGINAL BANANA PUDDING

MAKES 16 (1/2 CUP) SERVINGS

3/4 cup granulated sugar
1/3 cup all-purpose flour
Dash of salt
4 eggs, separated, at room temperature
2 cups milk
1/2 teaspoon vanilla extract
35 to 45 NILLA Wafers
5 to 6 medium size fully ripe bananas, sliced

Reserve 1 banana and 10 to 12 NILLA Wafers for garnish.

Combine 1/2 cup sugar, flour and salt in top of double boiler. Stir in 4 egg yolks and milk; blend well. Cook, uncovered, over boiling water, stirring constantly until thickened. Reduce heat and cook, stirring occasionally, for 5 minutes. Remove from heat; add vanilla. Spread small amount on bottom of 1-1/2-quart casserole; cover with layer of NILLA Wafers. Top with layer of sliced bananas.

Pour about 1/3 of custard over bananas. Continue to layer wafers, bananas, and custard to make 3 layers of each, ending with custard. Beat egg whites until stiff but not dry; gradually add remaining 1/4 cup sugar and beat until stiff peaks form. Spoon on top of pudding, spreading to cover entire surface and sealing well to edges. Bake at 425°F. for 5 minutes or until delicately browned. Cool slightly or chill. Just before serving, garnish with banana slices, then NILLA Wafers upright around edge of dish, as pictured on package.

NABISCO

Nilla®

WAFERS

Low Cholesterol
Low Saturated Fat
CONTAINS 5g FAT AND 5mg CHOLESTEROL PER SERVING
FOR NUTRITION INFORMATION

NET WT 12 OZ (340g)

Nilla Wafers..

- Low Cholesterol
- Low Saturated Fat

CONTAINS 5g FAT AND 5mg CHOLESTEROL PER SERVING

Nutrition Fact

Serving Size 8 cookies (32 g)
Servings Per Container About 11

Amount Per Serving

Calories 140	Calories from Fat 4
	% Daily Value
Total Fat 5g	7
Saturated Fat 1g	5
Polyunsaturated Fat 0g	
Monounsaturated Fat 1.5g	
Cholesterol 5mg	2
Sodium 105mg	4
Total Carbohydrate 24g	8
Dietary Fiber 0g	0
Sugars 12g	
Protein 2g	

Vitamin A 0% • Vitamin C 0
Calcium 2% • Iron 4%

* Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs:

	Calories:	2,000	2,500
Total Fat	Less than	65g	80g
Sat Fat	Less than	20g	25g
Cholesterol	Less than	300mg	300m
Sodium	Less than	2400mg	2400m
Total Carbohydrate		300g	375g
Dietary Fiber		25g	30g

Calories per gram:
Fat 9 • Carbohydrate 4 • Protein 4

INGREDIENTS: ENRICHED WHEAT FLOUR (C TAINS NIACIN, REDUCED IRON, THIAM MONONITRATE [VITAMIN B1], RIBOFLAVIN [VI MIN B2]), SUGAR, VEGETABLE SHORTEN (PARTIALLY HYDROGENATED SOYBEAN O HIGH FRUCTOSE CORN SYRUP, WHEY, BUT (PASTEURIZED CREAM, SALT, ANNATTO COLO EGGS, LEAVENING (BAKING SODA, CALCI PHOSPHATE), SALT, MONO-AND DIGLYCERID (EMULSIFIER), VANILLA EXTRACT, ARTIFIC FLAVOR.

This package is sold by weight, not by volu Packed as full as practicable by modern a matic equipment. It contains full net we indicated. If it does not appear full wh opened, it is because contents have set during shipping and handling.

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RITZ
CRACKERS

Food Guide Pyram
A Guide to Daily Food Choice

Source: U.S. Department of Agricu
U.S. Department of Health and Human S

- The Food Guide Pyramid s
how to build a healthful d
eating a variety of foods eac
- Ritz Crackers are part o
"Bread, Cereal, Rice and P
Group." Nutrition experts re
mend eating the most from
important group–6-11 serv
daily.
- Grain foods supply carbohyd
—an excellent source of en

RITZ

Mock Apple Pie

MAKES 8 SERVINGS

Pastry for two-crust 9-inch pie
36 RITZ Crackers, coarsely broken (about 1 3/4 cups crumbs)
2 cups water
2 cups sugar
2 teaspoons cream of tartar
2 tablespoons lemon juice
Grated rind of one lemon
2 tablespoons BLUE BONNET Vegetable Oil Spread
1/2 teaspoon ground cinnamon
(NO APPLES NEEDED)

Roll out half the pastry and line a 9-inch pie plate. Place crackers in prepared crust. In saucepan, over high heat, heat water, sugar and cream of tartar to a boil; simmer for 15 minutes. Add lemon juice and rind; cool. Pour syrup over crackers. Dot with spread; sprinkle with cinnamon. Roll out remaining pastry; place over pie. Trim, seal and flute edges. Slit top crust to allow steam to escape.

Bake at 425°F for 30 to 35 minutes or until crust is crisp and golden. Cool completely.

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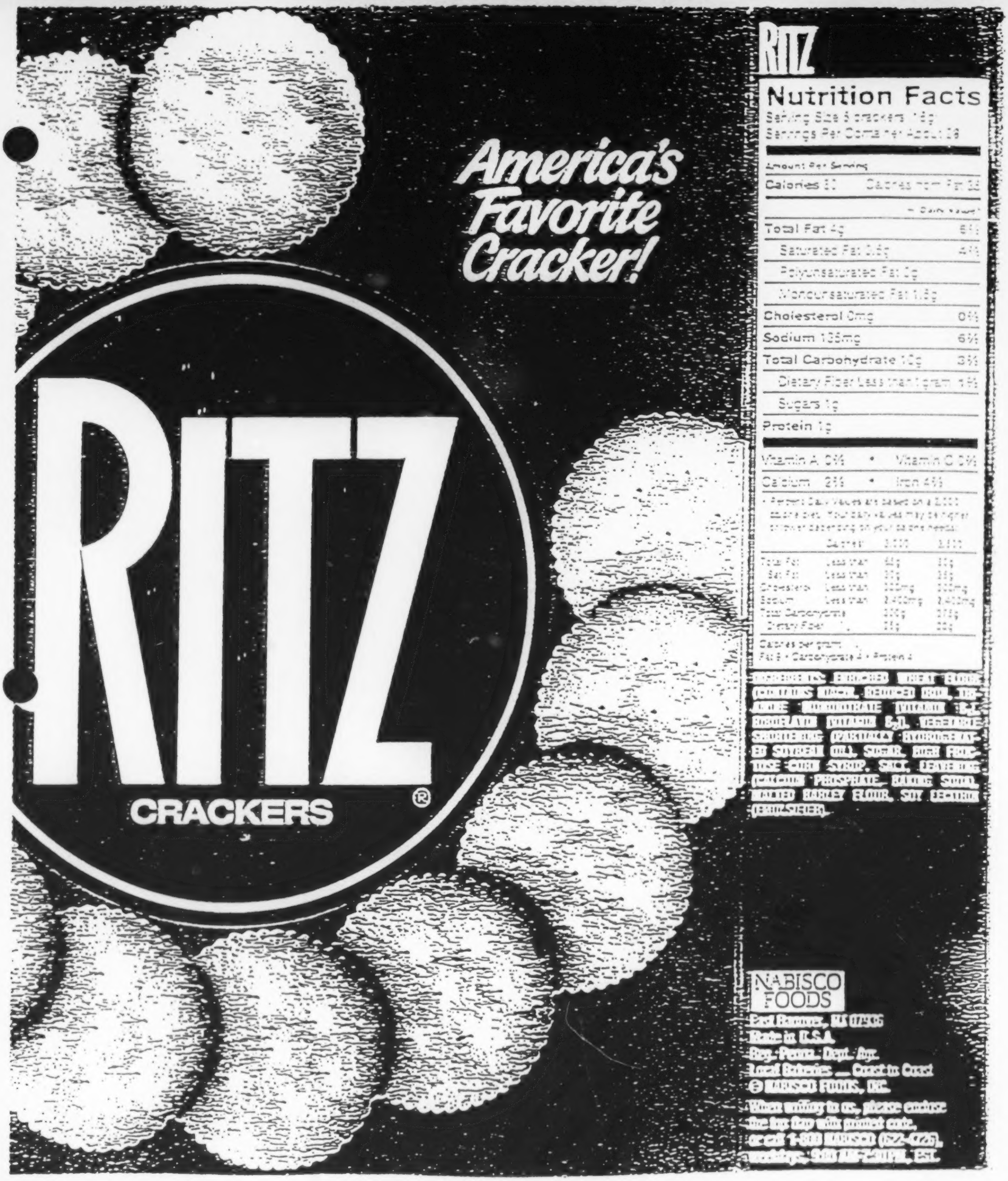

Nutrition Facts

Serving Size 5 crackers 16g
Servings Per Container About 28

Amount Per Serving	
Calories [illegible]	Calories from Fat [illegible]
	% Daily Value*
Total Fat 4g	6%
Saturated Fat 0.5g	4%
Polyunsaturated Fat 0g	
Monounsaturated Fat 1.5g	
Cholesterol 0mg	0%
Sodium 135mg	6%
Total Carbohydrate 10g	3%
Dietary Fiber Less than 1 gram	4%
Sugars 1g	
Protein 1g	

Vitamin A 0% • Vitamin C 0%
Calcium 2% • Iron 4%

* Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs:

	Calories:	2,000	2,500
Total Fat	Less than	65g	80g
Sat Fat	Less than	20g	25g
Cholesterol	Less than	300mg	300mg
Sodium	Less than	2,400mg	2,400mg
Total Carbohydrate		300g	375g
Dietary Fiber		25g	30g

Calories per gram:
Fat 9 • Carbohydrate 4 • Protein 4

INGREDIENTS: ENRICHED WHEAT FLOUR (CONTAINS NIACIN, REDUCED IRON, THIAMINE MONONITRATE [VITAMIN B1], RIBOFLAVIN [VITAMIN B2]), VEGETABLE SHORTENING (PARTIALLY HYDROGENATED SOYBEAN OIL), SUGAR, HIGH FRUCTOSE CORN SYRUP, SALT, LEAVENING (CALCIUM PHOSPHATE, BAKING SODA), MALTED BARLEY FLOUR, SOY LECITHIN (EMULSIFIER).

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